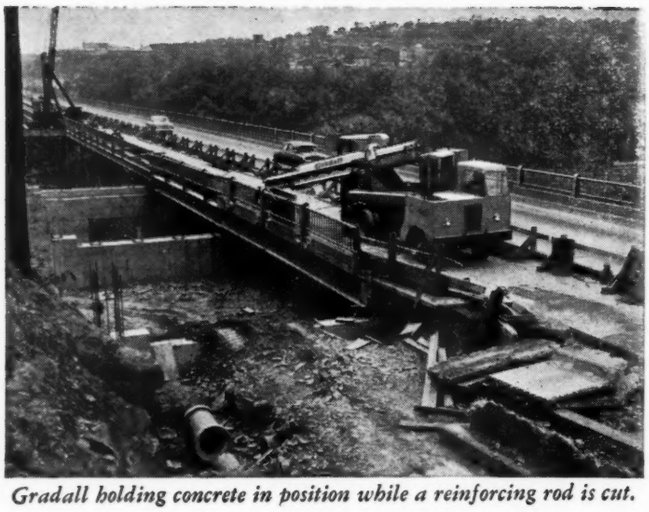
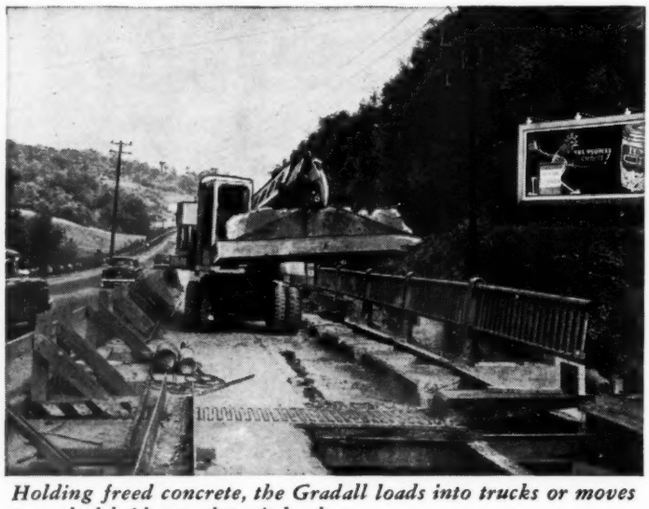
12

Gradall, with Vulcan 100 Piledriver, breaks concrete to expose reinforcing rods.



Gradall holding concrete in position while a reinforcing rod is cut.

After snaking the concrete from under guard rail, Gradall lifts slab from deck.



Holding freed concrete, the Gradall loads into trucks or moves to end of bridge to deposit load.

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TO HELP in widening Route 22, connecting Pittsburgh's Interbelt Freeway to the Pennsylvania Turnpike, Gradall was called upon for the difficult task of removing bridge deck, digging footers, stripping forms and many other jobs.

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Contractors and Engineers

magazine of modern construction

CONTENTS

DECEMBER 1957

BUILDINGS

5 Outside steel framework for college building

114 Folded plate thin-shell roof precast in 48 sections

GENERAL

6 Drill barge speeds dredging in Great Lakes channel

20 New roller-compactor rig nearing production stage

68 Protect your tractor parts when working in rock

70 Powder-lancing cuts demolition cost by 30 per cent

MAINTENANCE

16 Contractor's year-round maintenance curbs downtime

MANAGEMENT

98 Firm's calculators halve field clerical costs

107 Planning and production: expediting materials

MEETING

10 Lubrication institute panel on easier servicing

PRODUCT PARADE

71 Description of new equipment and materials

101 Listing of available literature

22 Start made on Glen Canyon, Flaming Gorge dams

26 Access road, airstrip, town take shape at Glen Canyon

38 Bolts support roof of Glen Canyon diversion tunnel

46 Excavation starts Glen Canyon spillway inlet tunnels

56 Bridge skewbacks built into vertical walls of canyon

60 Townsite, access road jobs open Flaming Gorge work

DEPARTMENTS

53 Avoid Legal Pitfalls

108 Construction Camera

13 Convention Calendar

105 Distributor Doings

4 Editorial

96 Labor Review

113 Manufacturer Memos

14 Names in the News

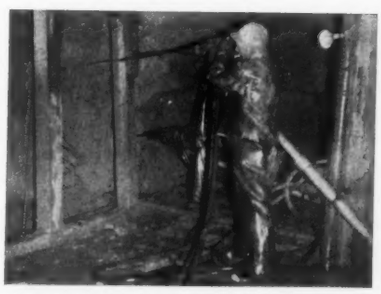
122 Publisher's Postscript

94 Surveying Washington

119 The Lighter Side

Roller-compactor gets test run. Page 20

Glen Canyon townsite. Page 26



Drilling for diversion tunnel. Page 38

Folded-plate roof cast in 48 sections. Page 114

editorial

No mirage in the desert

A hundred years ago when Horace Greeley quoted "Go West, young man", he was not thinking expressly of the Great Southwest American desert that begins in the second tier of states beyond the Mississippi River and stretches westward to the Pacific. But that great expanse of picturesque country with its mountains, deep gorges, and sparsely settled arid land is undergoing a renaissance that is booming the desert states. Since the close of World War II, tourists, industrial plants, nuclear research, atomic weapons, electronic and aircraft factories, uranium, oil, and other natural resources have been turning this arid region into one of the fastest-growing sections of the United States.

Lack of water has hampered the growth of this area, to be sure. Rainfall averages less than 10 inches a year in the Southwest, as compared with forty inches in the states of the Atlantic coastal plain or in the Appalachian mountains. The importance of water to a region is what makes the Upper Colorado Storage Project of such vital interest to a nation. This great construction job, now getting under way, is the subject of six major feature articles in this issue. Work has started on two of the main dams included in the project—Glen Canyon on the Colorado River and Flaming Gorge on the Green River. Two more will come later—Navajo on the San Juan and Curecanti on the Gunnison. These dams will impound the Colorado and its tributaries to feed irrigation projects providing water for 132,000 acres of new land, and supplemental irrigation of 234,000 acres of other land. Portions of five states will benefit—Arizona, New Mexico, Utah, Colorado, and Wyoming. In addition to the irrigation feature, about a million kilowatts of hydroelectric power will be generated at the first two dams being built.

Construction of these dams and storage reservoirs in the Upper Colorado River basin is presenting a challenge that is reminiscent of what we, in retrospect, like to call "the opening of the West". The project has all the hallmarks of what is romantic in civil engineering construction. It has the isolated location on a great plateau, crossed by the ranges and buttes of the Rockies. At an altitude of around 4,000 feet, the construction stiffs can expect howling blizzards in the winter and intense heat in the summer. New construction towns had to be built to accommodate the thousands who will work on the project.

Logistics is as much of a problem to a construction job of this size as it is to an army. At Glen Canyon, the nearest railhead to the left bank is at Flagstaff, Arizona, 135 miles away. From the right bank it is 174 miles to the nearest railhead at Marysvale, Utah. In the beginning, to get from one side of the canyon to the other, men had to make a 225-mile ride over roads and desert trails. Light planes were pressed into service to shuttle personnel back and forth across the more than 700-foot-deep gorge. A cableway was thrown across the 1,200-foot-wide canyon to handle men and some light materials and equipment. A temporary footbridge followed, and a vehicular span is now under construction in what is one of the more spectacular phases of the work.

Contractors were somewhat apprehensive at first about a supply of labor. Would the hard hat answer the call of the wild and far-off places to do a job that had to be done? He did. The ever-adventurous construction stiff responded to the call of work in one of the last frontiers of these United States. There has been no shortage of the necessary labor. He won't admit it, but the incurably romantic construction worker cannot stay away from the big, tough projects. He'll laugh at the mention of romance, and say as one did, "The only reason I came to this desolate place is because it's good for my sinuses."

A shot cuts into the right bank spillway intake area at Glen Canyon Dam, marking the end of the day shift on the Merritt-Chapman & Scott Corp. job. Sandstone is being gouged to a depth of 130 feet. Clear of the blast, two Lima 1601 shovels, two International 24-ton Payhaulers, and an International TD-24 tractor-dozer wait to resume work. A compressed air line runs onto the "Beehive"—a well known natural formation—part of which is being cut away to make room for the cableway. Page 46

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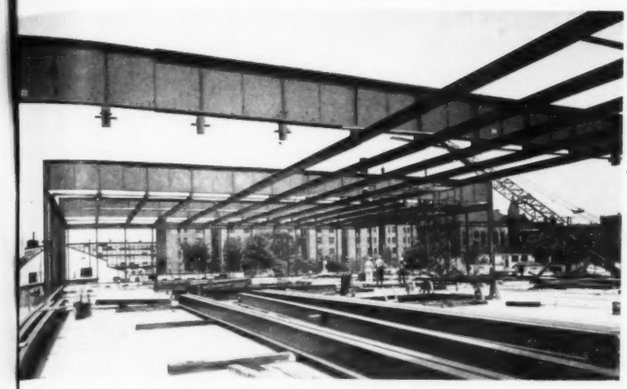

At left are main plate girders and supporting columns that form the basic skeleton of the 220×120-foot building for the Illinois Institute of Technology. The completed structure, right, has mullions spaced at 10-foot intervals and welded to the roof fascia plate, floor-level fascia channel, and ground-level sill angle.

Inside-out frame construction used in new college building

When structural steel was being erected for a building in Chicago, Ill., it suggested an arrangement of overhead monorail conveyor systems for a manufacturing plant. Actually, the parallel beams are roof purlins of a new 220 × 120-foot building that houses the architecture, design, and planning department of the Illinois Institute of Technology.

The 26,400-square-foot building is completely contained within an outside framework or skeleton. The framework consists of four 120-foot all-welded plate girders that have a 6-foot-deep web and a flange thickness increasing to 2¾ inches at the center, carried on wide-flange columns. Web stiffeners are spaced every 5 feet across the span, of heavier section above the purlin hangers.

Eleven rows of purlins are welded to the hangers, which are attached to the girder flanges. The 2½-inch-thick metal roof deck is welded to the top flanges of purlins; the ceiling is hung from the lower flanges. Between the four columns, front and rear, and along both sides are structural mullions spaced 10 feet apart. The mullions are welded to a 26-inch continuous roof fascia plate, to a main floor fascia 15-inch channel, and, at their lower ends, to a 6×6×½-inch sill angle. The floor level is about 6 feet above grade, providing natural illumination to basement classrooms and workshops.

Walls are plate-glass panels from floor to roof fascia, sandblasted for the lower 7 feet and in the basement to diffuse light. Window frames are of welded steel bar sections, bolted to structural mullions with suitable sealing. All welding was done with Lincoln Electric equipment.

The $750,000 building required only 285 tons of structural steel, mostly plate, angles, and wide-flange beams.

THE END

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McIntosh Studio photos

World's longest trench-type tunnel

New 7,479-foot tunnel under Hampton Roads is paved with Texaco Asphaltic Concrete

Contractors

Merritt, Chapman & Scott Corp. New York City (General contractor)

Ames and Webb, Inc., Norfolk, Va. (Asphalt contractor)

This tunnel is part of a $60 million bridge-tunnel facility which links Norfolk and Hampton, Va. across Hampton Roads. The tunnel lies between two man-made islands, each connected with the shore by a bridge.

Traffic through the tunnel in the beginning is expected to average 6,400 vehicles a day. This traffic, which will be concentrated in two lanes, is served by a hot-mix Texaco Asphaltic Concrete pavement. The pavement was laid in two courses, with a combined compacted thickness of four inches.

Rugged, flexible, joint-free Texaco Asphaltic Concrete is a heavy-duty pavement. Its ability to absorb punishing impact with a minimum of upkeep has been demonstrated in tunnels, on bridges, main highways and runways of major airports.

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Helpful information about Hot-mix Asphaltic Concrete and other types of asphalt paving is supplied in the booklet, "Plant-mixed Texaco Asphalt Paving." Our nearest office will be glad to send you a copy.

Laying hot-mix Texaco Asphaltic Concrete pavement on one of the approach ramps to tunnel under Hampton Roads.

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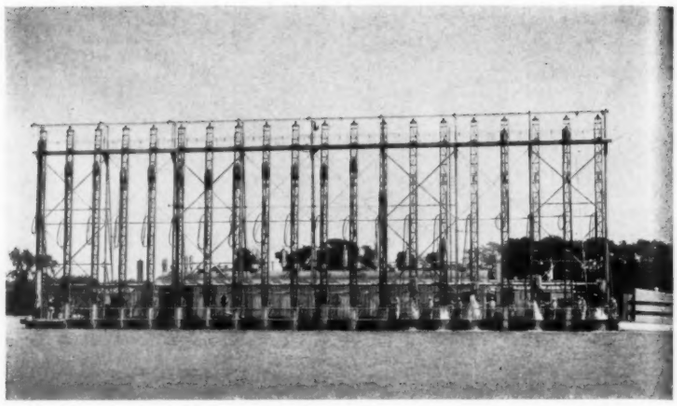
Water and drilled-rock particles shoot out of the end of a hollow steel sleeve encasing the drill shaft for its length under water. This provides a clean hole for packing 20 to 30 pounds of dynamite per hole when drilling is completed.



The 20-frame drill barge, Hornet IV, puts down blast holes in the Amherstburg Channel. Each mast carries a Joy TM 500 air drill and two Ingersoll-Rand air hoists. The barge was built by a joint-venture firm, The Marine Operators, for the deepening program on the Great Lakes connecting channels.

Unique drill barge sinks 20 holes 8 feet deep every 65 minutes for channe

Drill rig combines with barge-mounted walking dragline to clear rock in Amherstburg Channel

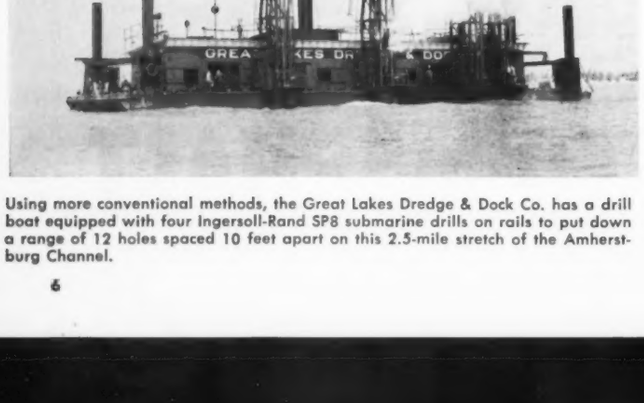
by BILL ALLEN, field editor

Many unique construction techniques and machines are speeding up the $136 million deepening program on the Great Lakes connecting channels. Chief among the equipment is a barge mounting 20 drills that shoots twenty 8-foot-deep holes every hour and five minutes. This speed can be maintained because it is not necessary to position the drills which are fixed on 8-foot centers. Also contributing to the speed of the operation is the modern drilling and compressor equipment on the new barge.

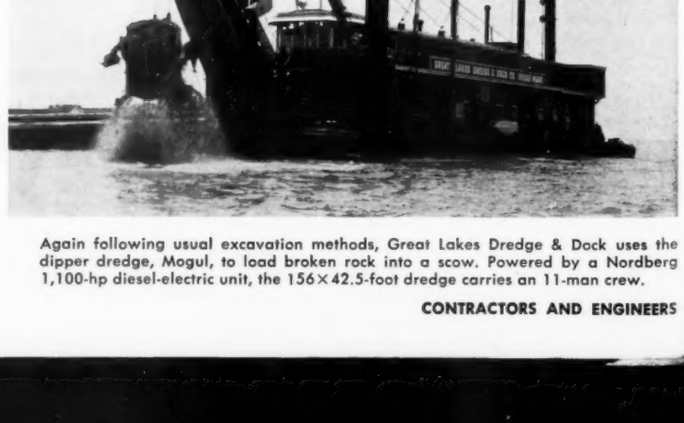
Keeping pace with the channel blasting is a big walking dragline mounted on a steel barge. Having no trouble finding its "sea legs", the Bucyrus-Monighan 9-W drags out 12 yards of material on each swing.

Dredging the Amherstburg Channel began in May of this year, marking the start of a tremendous program undertaken by the U. S. Army Corps of Engineers to improve the connecting channels of the Great Lakes. The over-all program involves removing about 44 million cubic yards of material that covers 130 miles of channel. When completed in 1963, the deepened channels will permit complete freedom on the lakes for freight carriers up to

Drilling and blasting completed in one section, another unique rig, the Samson, moves in to excavate the broken rock. The steel hull of the Samson carries a 700-ton Bucyrus-Monighan 9-W equipped with 160-foot boom and Esco 12-yard bucket.



Using more conventional methods, the Great Lakes Dredge & Dock Co. has a drill boat equipped with four Ingersoll-Rand SP8 submarine drills on rails to put down a range of 12 holes spaced 10 feet apart on this 2.5-mile stretch of the Amherstburg Channel.



Again following usual excavation methods, Great Lakes Dredge & Dock uses the dipper dredge, Mogul, to load broken rock into a scow. Powered by a Nordberg 1,100-hp diesel-electric unit, the 156×42.5-foot dredge carries an 11-man crew.

25.5 feet in draft, and will accommodate all ocean-going vessels using the St. Lawrence Seaway.

Work on two channels

Work on the project is now underway on two main channels. Three contractors are now dredging 15 miles of channel in the St. Mary's River which joins Lake Huron with Lake Superior. For the deepening of the Amherstburg Channel in the lower part of the Detroit River, three contracts have been awarded. Two are held by The Marine Operators, a joint venture composed of Al Johnson Construction Co., Minneapolis, Minn., Peter Kiewit Sons' Construction Co. and Cunningham-Kiewit Co., Inc., Omaha, Nebr., and Morrison-Knudsen Co., Inc., Boise, Idaho.

The Marine Operators' contracts, which total $16.3 million, involve the dredging of approximately six miles of Amherstburg Channel. Dredging a 2½-mile stretch in the lower portion of the channel is being handled by the Great Lakes Dredge & Dock Co., New Orleans, La., under a $6.6 million contract.

About 7 feet of ledge rock and overburden are being dredged from the bottom of the existing channel to give a project depth of 28.5 feet below low-water level. Part of the 3 million cubic yards of dredged material will be used to build compensating dikes, while the remainder will be wasted in disposal areas outside the channel.

Since there are two parallel channels in the lower part of the Detroit River, it was no great problem to maintain the ship traffic during the dredging. The contractors dredge only half the 600-foot width of the Amherstburg Channel at a time, leaving the other half open to upbound traffic. Downbound traffic is handled at all times by the Livingston Channel, which will be deepened under a future contract.

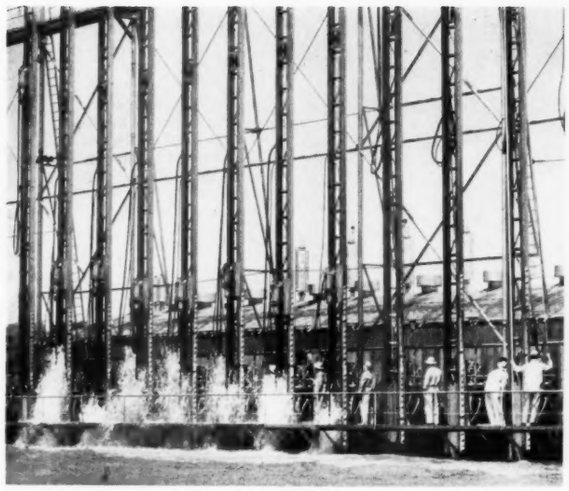
Drill rig built on job

Although The Marine Operators did not start the actual dredging until May of this year, an important phase of the work started in January. This was the construction of the 20-drill barge, Hornet IV, which was built on the Canadian side of the river, about 14 miles upstream.

The 30×160-foot sectional steel hull carries twenty 50-foot masts mounted on 8-foot centers across the front of the barge. Each mast carries a Joy TM 500 air drill with 40 feet of steel and a 4½-inch bit. Mounted also on each mast are two Ingersoll-Rand air hoists. One hoist raises the drill, and the other lifts the long pipe which encloses the drill for its length under water. Pipe serves as an outlet for blowing the drillings and as a loading tube for placing the dynamite in the hole.

The drilling equipment is powered by an imposing battery of compressors. Furnishing air to the drills and hoists are seven new Ingersoll-Rand

(*Continued on next page*)



The 20 holes are not drilled simultaneously. Seven crewmen move down the line to drill seven holes at a time. Working around the clock, men were able to shoot twenty 8-foot-deep holes every hour and five minutes.

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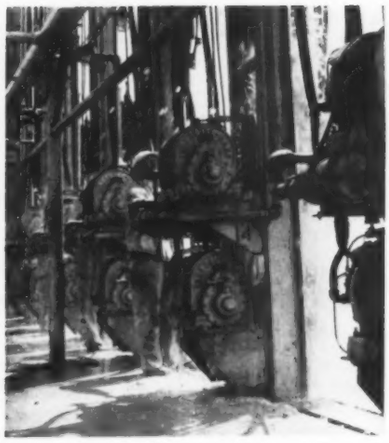

During drilling, a crewman on the Hornet IV checks the Ingersoll-Rand air hoists. One of the air hoists raises the Joy TM 500 air drill, and the other lifts the pipe which encloses the drill under water.

(*Continued from preceding page*)

900-cfm rotary compressors powered by Detroit Diesel 300-hp engines.

Drilling goes fast

In the drilling operation, the barge works across the 300-foot half-width of the channel. The barge maneuvers by means of cables secured to outboard anchors and piling, operated by two American hoists, near the shore. Four spuds, operated by Ingersoll-Rand air motors and reduction gears, are set down to secure the barge during drilling operations.

After the rig has pulled back 8 feet from the line of 20 holes previously shot, the spuds are set down and the drilling cycle begins. The long pipe that encases the drill is first lowered to rest on the bottom. The 4½-inch bit cuts the hole to about an eight-foot depth while drillings are blown out the top of the pipe. A crew of from 6 to 7 drillers moves down the line until the row of 20 holes is completed. Sticks of 60 per cent dynamite are dropped and tamped into the drill holes through the pipes as soon as drilling is completed.

Firing wires connect the separate charges to a main lead running along the front of the barge. After the pipes have been raised, the barge pulls itself out of range, and fires the blast. Seven delays are used in firing the 350 to 600 pounds of dynamite.

The round-the-clock drilling operation requires 18 men per 8-hour shift. And on one shift the men are able to shoot 6 rows of 8-foot-deep holes. This means an impressive average of 20 holes every hour and five minutes.

Dragline moves rock

To move the broken-up rock, The Marine Operators have assembled a unique rig. Called the Samson, the 175×65-foot steel hull carries a Bucyrus-Monighan 9-W. The big walking dragline is equipped with a 160-foot boom and an Esco 12-yard bucket. The Monighan, which was walked onto the barge, rests on a mat of I-beams with 2-inch boards on top and bottom. The weight of the 700-ton dragline is counterbalanced by sand loaded in the rear compartments of the hull.

The rig faces downstream, dragging its bucket against the current. It maneuvers on 3 spuds—one on each side and one on the stern. A stern anchor line holds the barge against the current while the line to the big bucket swings the rig to change its position.

Four flat scows carry the material from the floating dragline to a dragline stationed on a dike in the middle of the river. The Manitowoc 4500 dragline builds the dike from rock unloaded from the scows.

Seismograph checks blasting

In places where blasting occurred only a few hundred feet from residences along the river shore, the Corps of Engineers kept a careful check on ground vibrations. Three portable Vibra-Log seismographs, manufactured by W. F. Sprengnether Instrument Co., St. Louis, Mo., were used to check the magnitude of the shock waves. A crew set the seismograph on the ground near residences opposite the blasting. By using a Motorola 2-way portable radio, the crew was able to synchronize its recording with the time of the blast. In the early stages of the blasting, high readings on the seismograph made it necessary to use 7 delay periods with electric caps instead of two to three delays with Primacord.

To assure the citizens of Amherstburg, Ontario, that the blasting would not endanger their homes, the Corps of Engineers maintained an active public relations program. Articles were presented to the local newspaper explaining the nature and effects of the blasts, and Corps of Engineers' personnel met with town of-

BIG ST. LAWRENCE SEAWAY earth-moving job—improving the channel at Sparrowhawk Point and Toussaints Island—is being done by Merritt-Chapman & Scott. Tough jobs like this are made easier by simplifying lubrication. In fact, all major lubrication c be handled with no more than six lubricants, if you use a Texa Simplified Lubrication Plan. A Texaco Lubrication Engineer w

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ficials to explain the operation and point out the careful control kept on the blasting.

Second dredge contract

Using more conventional methods, The Great Lakes Dredge & Dock Co. is working a 2.5-mile stretch of Amherstburg Channel several miles downstream.

For the drilling operation, the contractor uses the drill boat M-1 equipped with four Ingersoll-Rand SP8 submarine drills. The drills, which ride on rails, put down a range of 12 holes spaced 10 feet apart.

The dipper dredge, Mogul, excavates the broken rock. The 156×42.5-foot dredge carries a 65-foot dipper stick with a 9 or 12-yard bucket. Powered by a Nordberg 1,100-hp diesel-electric unit, the dredge was fabricated by Manitowoc and contains Bucyrus-Erie dredging machinery. The 11-man crew per shift works round-the-clock and is quartered on the dredge. The dredge loads two 1,500-cubic-yard bottom dump scows which are pushed by tug to a disposal area.

Lights guide drill rig, dredge

To determine the distance of the drill rig from the channel center line, the contractor set up a unique sighting device. Near the center of the job, a cable was strung between two H-beam piles across half the width of the channel. At fixed intervals along the cable, crews set vertical wooden slats, each identified by a colored light bulb running off a shore line. This was one set of sights. About a thousand feet upstream, another cable was strung between two H-beam piles across half the width of the channel. In the same manner as before, vertical slats were attached at fixed intervals along the length of the cable. Only on these vertical slats fluorescent lights were used instead of colored bulbs. Detroit Diesel generators furnish power for the lights.

By lining a rig in between known pairs of lights, the contractor could control the location of the drilling and dredging operations along the length of the channel. The fluorescent lights were visible at night and on foggy days.

Just before a blast goes off, a member of the Corps of Engineers checks the Vibra-Log portable seismograph which records ground vibrations. If the vibrations are too high, the engineer contacts the barge by a Motorola two-way radio, right, to cut down on the amount of blasting.

Personnel

The project is under the supervision of the Detroit District of the U. S. Army Corps of Engineers. The district engineer is Col. Peter C. Hyzer. Supervising the dredging operations are Fred R. Smith, resident engineer, and Richard Sneed, assistant resident engineer.

R. E. "Bob" Englehart is project manager for The Marine Operators, J. H. King is general superintendent, and Warren Larson is project engineer. Project manager for the Great Lakes Dredge & Dock Co. is Mel Lemmerhirt. THE END

Armco plans acquisition of Union Wire Rope

Acquisition of the business and assets of Union Wire Rope Corp., Kansas City, Mo., by Armco Steel Corp., Middletown, Ohio, has been approved by the boards of directors of both companies and is awaiting the approval of Union Wire Rope stockholders.

The merger plan provides for an exchange of shares, on the basis of one share of Armco for 2½ common shares of Union Wire Rope.

Should the merger become effective, Union Wire Rope, maker of high-carbon wire, wire rope, and other high-carbon wire rope products, would be operated as a subsidiary of Armco.

Some $784 million in contracts for the Interstate System was awarded by the end of fiscal 1957.

show you how it can help you cut lubricant inventory, avoid mistakes, and save both time and money.

Moving millions of yards of earth for the St. Lawrence Seaway... How Texaco helps

Move millions of yards of earth—and do it on schedule—and you prove you've got good equipment and good lubrication, especially when temperatures range from 90° above to 25° below.

Here are some of the ways Texaco Products help keep big earth-moving jobs on the go.

Keeping engines clean. *Texaco Ursa Oil Super Duty* keeps rings free; valves seating properly. You get full compression and complete combustion. And every piece of equipment stays on the job—always at full rated power.

For air compressors and hydraulic mechanisms, use *Texaco Regal Oil R&O*. It keeps compressor systems clean, prevents rust, sludge and foam in hydraulic systems. To reduce the performance cost for differentials and transmissions, use *Texaco Universal Gear Lubricant EP*. For general lubrication, *Texaco Marfak Heavy Duty Special 2* is a multi-purpose grease suitable for wheel bearings, chassis, water pumps and other lubrication.

Ask a Texaco Lubrication Engineer to help you simplify your lubrication and reduce your costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

For more facts, use Request Card at page 18 and circle No. 204

Panel smooths path toward

simpler equipment servicing at lubrication institute meeting

Recognizing the impact of the Federal Highway Program on the lubricating grease industry, the National Lubricating Grease Institute at its 25th annual meeting featured a panel session on the lubrication of road-building equipment.

The panel of four experts spoke to an audience of about 400 at the Edgewater Beach Hotel in Chicago on October 29. Although all the panel members were concerned with the problems of lubricating earthmoving equipment, each attacked the problems from a different viewpoint—that of the contractor, the builder of earthmoving equipment, the supplier of lubricants, and the manufacturer of dispensing equipment.

While representing different industries, the members were in agreement on many points:

(1) To protect expensive road-building equipment, contractors should place more emphasis on a good lubrication program. (2) Money spent on this type of preventative maintenance is returned many times over by longer equipment life and fewer breakdowns. (3) Present recommendations for the correct lubrication of a piece of equipment are confusing and contain too many different types of lubricants to be practical. (4) Manufacturers of construction equipment and lubricant suppliers should work out a simplified standard for the uses of different types of grease.

The incoming president of NLGI, R. Cubicciotti, left, gets the congratulations of outgoing president J. W. Lane of Socony Mobil Oil Co.

Introducing the members of the panel was G. W. Krause, vice president of Battenfeld Grease & Oil Corp. In his introductory speech, Krause emphasized the magnitude of the highway construction program and its effect on the road-building equipment industry. Krause estimated that for each additional billion dollars spent in highway construction, $500 million of new equipment will have to

←For more facts, circle No. 205

Northwestern Engineering Co.'s D8 works fast

stockpiling hot mix material for 17 miles of road

You can see the hot mix material "flow" ahead of the blade in this picture—seven or eight tons of it at every pass. The Caterpillar D8 Tractor shown is equipped with a No. 8U Bulldozer. It's used in stockpiling 110,000 tons of base course material, 36,000 tons of hot mix and 7,000 tons of shoulder material—all of which will be used to surface 17 miles of new road near Newell, South Dakota.

This is one of the four D8s owned by Northwestern Engineering Co., Rapid City, S. D., on this project. In addition they have a CAT* No. 12 Motor Grader and two Caterpillar Engines powering the crusher. Superintendent Glenn H. Kistler says: "I've been operating Cat-built equipment for over thirty years, back to the days of the old Sixties, and have always had a preference for the big yellow machines."

Backed by the power and traction of the D8, the No. 8U Bulldozer is a big-capacity tool for handling any type of loose material. It's scientifically shaped to roll the load forward and *inward* with a minimum of side spillage. And it's ruggedly built to stand up under hard, steady work.

Your Caterpillar Dealer will gladly demonstrate the D8-No. 8U combination on your own job. You can count on him for reliable service and quality Caterpillar parts to keep your machines producing throughout their long work life.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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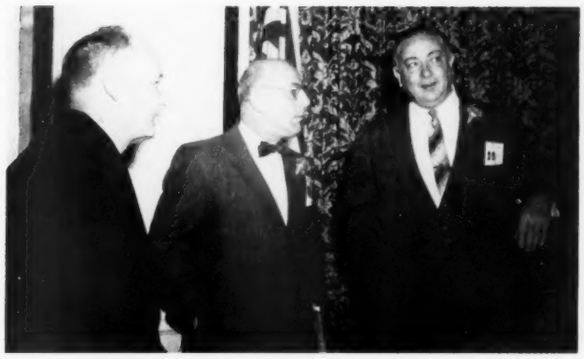
WANTED—
THE HARD WORK

Contractor, oil company, and makers of construction machinery and dispensing equipment point way to solution of problems



R. Cubicciotti, right, head of NLGI for the coming year, chats with two members of the panel on earthmoving equipment lubrication, T. M. Murphy, left, and G. K. Brower, center.

be built. This means that about $900 million of new equipment will be required in the first five years of the program.

Contractor's viewpoint

Directly concerned with the maintenance of this new equipment is R. L. Nelson, general superintendent, S. J. Groves & Sons, Minneapolis, Minn. Representing a contractor that has developed a first-rate preventative maintenance program, Nelson pointed out the importance of such a program, and some of the methods that have made it successful.

One of the lubrication problems that S. J. Groves & Sons met with a few years ago was the selection of the proper lubricant for a specific job. Recommendations by lubricant manufacturers were not consistent and often involved a large number of different types of oil and grease.

"One oil manufacturer", said Nelson, "made recommendations on one of our jobs that would have required the use of over 25 different types and weights of oils and greases. In 1954, we made an intensive study of the various manufacturers' recommendations for lubrication of our equipment and decided to cut the number of lubricants to a bare minimum. We are at the present time using only six types of oils and greases to lubricate our entire fleet on the new Ohio Freeway project."

In his paper, Nelson suggested that equipment and grease manufacturers develop these new maintenance aids:

"(1) A permanent type anti-freeze which would be compatible with engine oil in case of crankcase dilution. (2) Pocket-sized, plastic-covered, lubrication recommendation cards for use by field personnel. (3) Packaged open gear grease for use with calking guns. (4) A standard color code for identifying different types of lubricants. (5) More rigid and exacting lubrication standards for construction machinery. (6) More service literature and training schools."

Equipment maker's viewpoint

Representing the equipment manufacturer on the panel was G. K. Brower, project engineer for International Harvester Co. in the Construction Equipment Division, fuels and lubricants. In his paper he pointed out that lubrication of rigs is vastly complicated because equipment is operated in a wide range of climatic and environmental conditions. With International Harvester selling construction machinery to 147 countries

(*Continued on next page*)

The Rim that put Tubeless Tires in this picture

Tru-Seal Rim by Goodyear

ON jagged rocks, up steep grades, over rutted roads—today you can use tubeless tires almost anywhere—enjoy all the benefits of this great advance in tire construction.

One big reason is the development by Goodyear of the Tru-Seal Rim. This is the rim that has been adopted as standard by the Tire and Rim Association for tubeless replacement of all conventional tire sizes 12:00 and larger.

Tru-Seal is the only practical method yet devised to seal a multiple-piece rim. It adds one more to the many benefits Goodyear's vast tire-building experience brings to rim construction. With Goodyear rims, you profit by such advantages as:

Unusual Strength: Thanks to an exclusive double-welding process, and added support at points of greatest stress, present-day Goodyear Rims are far stronger than previous rims.

Ease of Tire Mounting: No tube and flap troubles.

Special Tools: Goodyear alone provides both hydraulic and hand tools especially made for larger wheel sizes.

Bond-a-Coat Finish: This protective coating affords long-lasting resistance to rust and corrosion.

If you have a rim problem, why not talk it over with the G.R.E. (Goodyear Rim Engineer). He'll save you time and money by helping you select the type and size of rim best suited to your needs. Write him at Goodyear, Metal Products Division, Akron 16, Ohio, or contact your local Goodyear Rim Distributor.

New Tru-Seal Rims – for sizes 12.00 and up, including all earth-mover and grader sizes. This rim is similar to multiple-piece rims now in use—PLUS airtight Tru-Seal rubber ring which compresses into sealing groove when tire is mounted.

Buy and Specify **GOODYEAR**

MORE TONS ARE CARRIED ON GOODYEAR RIMS THAN ON ANY OTHER KIND

Tru-Seal—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

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Lubrication problems are set for an airing as G. W. Krause of Battenfeld Grease & Oil Corp. introduces members of the panel on roadbuilding-equipment lubrication at the National Lubricating Grease Institute meeting. Left to right are R. L. Nelson of S. J. Groves & Sons, G. K. Brower of International Harvester Co., D. J. Rosselle and R. J. Brossmann of the Standard Oil Co of Ohio, and T. M. Murphy of the Alemite Division of Stewart-Warner Corp.

throughout the world, it is a big problem to develop a simple set of lubrication instructions.

Brower, too, is concerned with the complexity of recommendations for proper lubricants offered by the different oil companies. Results of a survey show that 41 viscosity-temperature recommendations for the engine oils have been made by 14 different companies. Although recently progress has been made in reducing the number of recommendations, there is a great need for industry-wide cooperation to simplify and standardize on instructions. Brower suggests that NLGI work with SAE to help set up the standards.

Oil company has its say

The oil company's view was given by panel members D. J. Rosselle and R. J. Brossmann of the Standard Oil Co. of Ohio. According to Rosselle, who prepared the paper jointly with Brossmann, the different recommendations of manufacturers for special types of lubrication have, in part, led to the complex number of oils and greases. For each of the five makes of crawler tractors that dominate the field, for example, the respective manufacturer specifies a certain type of lubricant for the track rollers.

But in recent years Standard Oil Co. has been successful in reducing the number of different types of lubricants recommended for servicing earthmoving equipment. In fact, the company has found it possible to "care for almost 95 per cent of the entire lubrication needs on most highway construction jobs with one motor oil in two viscosities, two greases, and a gear oil. This means only five drums to be handled and transported out on the job."

To reduce the number of greases, the company is developing high-quality multipurpose greases. To meet the requirements, the grease must be waterproof and have a high melting point. It must be a heavy-duty grease with good dispensability. It must resist impact and squeeze out, prevent rust, and resist throw-off, separation and bleeding.

From barrel to bearing

Representing the manufacturer of lubricant-dispensing equipment was T. M. Murphy. Murphy is the Industrial Sales Manager of the Alemite Division, Stewart-Warner Corp. His paper was concerned with a limited, but important phase of lubrication—getting the grease and oil from the barrel to the bearing.

Murphy pointed out the savings in time and money of using modern dispensing equipment rather than outdated hand-gun methods. His talk was illustrated with slides of lube trucks developed by contractors to service field equipment. These mobile service stations, equipped with light plant, compressor, drums and reels, greatly speeded lubrication.

Murphy feels that modern dispensing equipment is not the entire answer to a contractor's lubrication problems; the men behind the equipment are equally important. Murphy recommended that contractors "(1) Select and make responsible for over-all lubrication one capable individual. (2) Provide him with necessary personnel for training and carrying out his responsibilities. (3) Provide him with the equipment that will most enable him to do the lubrication job. (4) Insist that he establish proper procedures. (5) Insist that he maintain records."

Cubicciotti elected president

At the annual meeting, R. Cubicciotti, former vice-president, was elected to head NLGI activities for the coming year. Cubicciotti is vice-president of L. Sonneborn Sons, Inc., New York. He succeeds J. W. Lane of Socony Mobil Oil Co. THE END

Pick your favorite with a "Jimmy" Diesel

GM DIESEL ENGINES POWER 25 MAKE SH

Convention calendar

December 10 Material Handling Institute
Annual Meeting, Roosevelt Hotel, New York, N. Y. MHI, One Gateway Center, Pittsburgh 22, Pa.

December 11–12 National Construction Industry Conference
Conference, Congress Hotel, Chicago, Ill. V. J. Danilov, public relations manager, Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

January 6–10 Highway Research Board
Annual Meeting, Sheraton-Park Hotel, Washington, D. C. Fred Burggraf, director, HRB, 2101 Constitution Ave., Washington 25, D. C.

January 13–15 Weed Society of America
Meeting, Peabody Hotel, Memphis, Tenn. Leonard Lett, agronomist, WSA, National Cotton Council, P. O. Box 18, Memphis 1, Tenn.

January 16 The Beavers
Annual Award Dinner, Biltmore Bowl, Los Angeles, Calif. J. W. Watson, assistant secretary-treasurer, The Beavers, 3932 Wilshire Blvd., Los Angeles 5, Calif.

January 16–18 Associated General Contractors of Minnesota
Meeting, Hotel St. Paul, St. Paul, Minn. R. J. Hendershott, manager, AGCM, 910 Builders' Exchange Bldg., Minneapolis 2, Minn.

January 20–23 American Road Builders' Association
Annual Convention and Exhibit, Sheraton-Park Hotel, Washington, D. C. Norman T. Almquist, administrative services manager, ARBA, 600 World Center Bldg., Washington 6, D. C.

January 22–23 National Agricultural Limestone Institute, Inc.
Annual Convention, Hotel Statler, Washington, D. C. Robert M. Koch, president, NALI, 1015 12th St., N. W., Washington 5, D. C.

January 26–30 Associated Equipment Distributors
Annual Meeting, Conrad Hilton Hotel, Chicago, Ill. W. G. Bowman, administrative assistant, AED, 30 E. Cedar St., Chicago 1, Ill.

January 27–31 Prestressed Concrete Short Course
Second National Meeting, Ellinor Village, Daytona Beach, Fla., with The Prestressed Concrete Institute, 425 N. E. Fifth St., Boca Raton, Fla., as co-sponsor. Prestressed Concrete Short Course, Civil Engineering Department, University of Florida, Gainesville, Fla.

February 10–13 Associated General Contractors of America
Thirty-ninth Annual Convention, Statler-Hilton Hotel, Dallas, Texas. Wm. G. Dooly, Jr., public relations director, AGC, Munsey Bldg., Washington 4, D. C.

February 10–13 National Sand and Gravel Association and National Ready Mixed Concrete Association
Annual Convention and Exhibit, Conrad Hilton Hotel and Chicago Coliseum, Chicago, Ill. Vincent P. Ahearn, executive secretary, NSGA-NRMCA, 527 Munsey Bldg., Washington 4, D. C.

February 10–14 American Society for Testing Materials
Committee Week, Hotel Statler, St. Louis, Mo. Fred F. Van Atta, assistant secretary, ASTM, 1916 Race St., Philadelphia 3, Pa.

February 12–14 High-Speed Computer Conference
Conference, Pleasant Hall, Louisiana State University, Baton Rouge, La. J. W. Brouillette, director general extension division, HSCC, Louisiana State University, Baton Rouge, La.

February 17–19 Association of Asphalt Paving Technologists
Meeting, Sheraton-Mt. Royal Hotel, Montreal, Quebec, Canada. Ward K. Parr, secretary-treasurer, AAPT, 1224 East Engineering Bldg., Box 376, Ann Arbor, Mich.

February 20–21 Mississippi Highway Conference
Conference, University of Mississippi, University, Miss. D. C. Trexler, director department of conferences and institutes, MHC, P. O. Box 154, University, Miss.

February 24–27 American Concrete Institute
Fifty-fourth Annual Convention, Morrison Hotel, Chicago, Ill. A. Bates, general chairman, ACI, P. O. Box 4754, Redford Station, Detroit 19, Mich.

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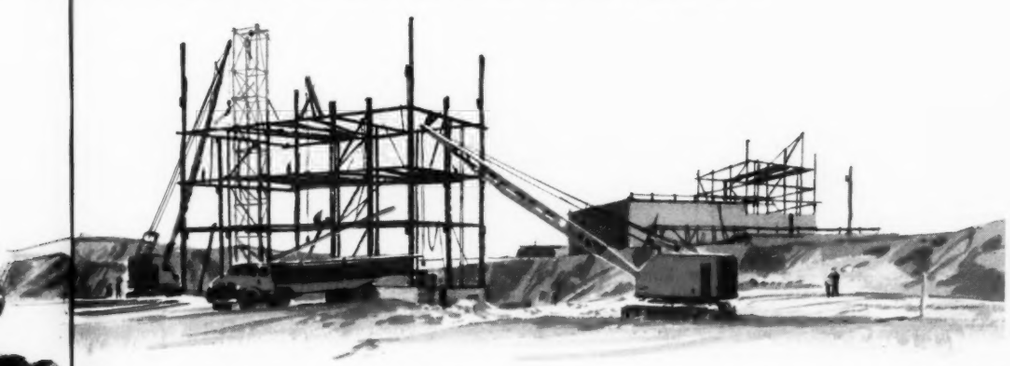
QUICK-WAY · SAUERMAN · Skagit · LIMEBELT SUPERIOR 1892 1911 1860 MUNDY · UNIT · WASHINGTON IRON WORKS

MAKE SHOVELS, CRANES AND HOISTS



LEADING manufacturers offer General Motors Diesel power in 156 different models of shovels, cranes, draglines and hoists—shovels from ⅜ yd. to 3½ yd.; cranes and hoists to 250-ton capacity.

Because these modern 2-cycle Diesels deliver power at *every* piston downstroke, they pack more usable power in less space. They start easily and pick up under load fast—maintain constant speed which pays off in easier digging and hoisting, faster cycles, high production and bigger profits.

Both single and multiple engine units are available with either mechanical or torque-converter drives—and with optional Hydrostarter which gives you positive, split-second starts, and eliminates the troubles and expense of electric starting systems.

When you standardize on GM Diesel power in your equipment, you get work done faster at less cost—lower initial cost, lower maintenance cost, lower parts cost. A single inventory of interchangeable parts serves all engines in a series—so you can operate with lower inventories and with far less time out for servicing.

And you have the backing of a worldwide network of GM Distributors and Dealers—with complete parts stocks and service facilities readily available everywhere.

Whatever excavator, crane or hoist you buy, you're money ahead with a "Jimmy"—*it's the world's thriftiest Diesel!*

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GM GENERAL MOTORS DETROIT DIESEL POWER

IT PAYS TO STANDARDIZE ON...
Available in 1485 applications of power equipment built by more than 175 manufacturers
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Autocar names engineers; Sternberg promoted

Benjamin B. Bachman, pioneer automotive engineer, is going into semi-retirement after 52 years' service with The Autocar Division of The White Motor Co., Exton, Pa. He will continue, however, on a part-time basis as director of engineering.

Part of Bachman's duties will be taken over by Ernest R. Sternberg, who has been appointed administrative engineer. Sternberg was formerly assistant to the vice president in charge of production at the Cleveland plant. Laurence Cooper, new chief engineer for Autocar, was formerly staff engineer.

Gardner-Denver names two district managers

Robert W. Hoke, Jr., has been named district manager of the Toronto, Canada, office of the Gardner-Denver Co., Quincy, Ill. He joined the company in 1948 serving as head of its Detroit, Mich., office, and in 1955 he became an industrial specialist.

Hoke replaces Robert H. Ganz, who has been made head of the Gardner-Denver district domestic office in Teterboro, N. J. Ganz replaces George Murphy who has been made special acounts representative in the Philadelphia, Pa., area.

Vibro-Plus appoints

Stephen L. Ferriol has been appointed as a sales engineer for Vibro-Plus Products, Inc., Stanhope, N. J. He will sell Vibro's Rollgear and Topdog line of internal and external concrete-vibrating equipment.

names in the news

Raymond Concrete Pile names Kiesel to new post

Charles B. Kiesel, Jr., has been named manager of domestic and foreign prestressed-concrete product sales for Raymond Concrete Pile Co., New York, N. Y. Kiesel, who joined the company in 1948 as assistant general superintendent, most recently served as a project manager. Assisting Kiesel in these new duties will be Myers Van Buren, prestressed products engineer. Robert N. Bruce, Jr., will handle sales in the Gulf of Mexico area from the Raymond company's office in New Orleans.

Charles B. Kiesel, Jr., manager of prestressed-concrete product sales for Raymond Concrete Pile Co.

Kiesel is also vice president and a director of Cen-Vi-Ro Pipe Corp. of South Gate, Calif. This corporation, jointly owned and operated by Raymond Concrete Pile Co. and Morrison-Knudsen Co., Inc., Boise, Idaho, makes concrete pipe, and licenses other pipe manufacturers to produce concrete pipe by the Cen-Vi-Ro method. The Raymond Co. has the exclusive license to manufacture prestressed-concrete cylinder piles by the Cen-Vi-Ro process.

The Raymond Concrete Pile Co. has also appointed John A. Guissinger to be the Puerto Rico district manager in charge of the two subsidiaries, Raymond Concrete Pile Co. of Puerto Rico and Raymond Construction Co. of Puerto Rico. Guissinger succeeds Robert B. Findlay, who was named a principal officer in the company's Venezuelan firm.

Addison Campbell has been made general superintendent in charge of all of Raymond Concrete's construction work in the Lake Maracaibo, Venezuela, area. He will have full responsibility for all construction personnel and equipment in the area.

N. H. Highways appoints

Reuel W. Webb has been appointed to the newly created post of assistant chief engineer for the New Hampshire Department of Public Works and Highways. This, the first major post created in the department for several years, is designed to effect closer liaison between the administrative office and the department's divisions.

Reuel W. Webb, assistant chief engineer for the New Hampshire Department of Public Works and Highways.

The new post will relieve the commissioner, deputy commissioner and chief engineer of some of the administrative load accompanying an accelerated road program.

Webb joined the department in 1933, after being graduated from the University of Maine. He left the highway service briefly, once to work as a junior engineer for the U. S. Forest Service in New Hampshire, and again to serve with the Seabees from 1943 to 1946.

N. C. highway commission promotes Irving, Crump

Hunter Irving has been appointed assistant chief engineer for construction and maintenance, and Earl Crump has been appointed assistant chief engineer for roadway and right-of-way by the North Carolina State Highway Commission.

They will join assistant chief engineer for administration Louis Payne and assistant chief for structures T. B. Gunter, Jr.

Each of the assistant chief engineers will handle four departmental functions in statewide highway matters. In administration, Payne will be responsible for all federal contacts, work orders, equipment, and stores. Irving will handle landscaping, maintenance, construction, materials, and tests. Crump will be in charge of survey work, highway design, cost estimates, contracts, and right-of-way matters. Gunter will oversee all hydrographic work, as well as the design, construction, and maintenance of bridges and structures.

Asphalt Institute names Col. Alcorn engineer

Lt. Col. Wesley D. Alcorn has been appointed district engineer at Chicago, serving Illinois, by The Asphalt Institute, College Park, Maryland. Col. Alcorn comes to the Institute from the U. S. Army Engineering School at Ft. Belvoir, Va., where he was chief of the Troop Construction Branch, supervising instruction in military geology, soils, and pavements.

During World War II, Col. Alcorn served with the Corps of Engineers, directing airfield construction in India and China. He returned to civilian

MR. CONTRACTOR

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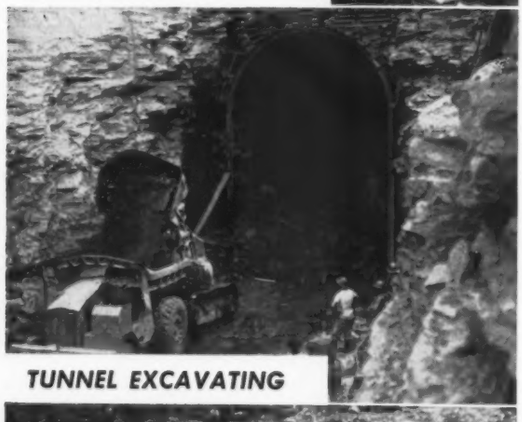
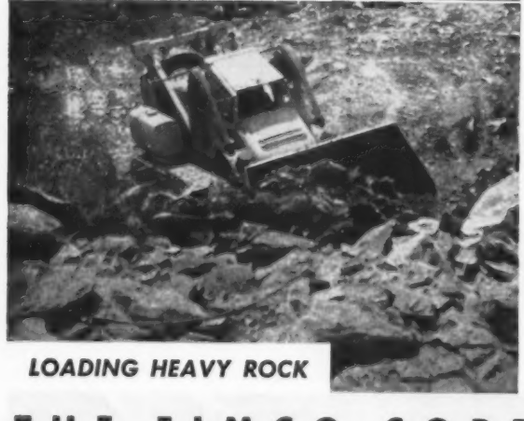
TIGHT QUARTERS



TUNNEL EXCAVATING



LOADING HEAVY ROCK

Illustrated are just three job conditions where 105 Eimco Excavators outperform other earthmovers. It takes care of the tough jobs just as efficiently as it does the easy ones.

The knowledge and experience gained from building thousands of underground loaders was used to full advantage when we designed and engineered the Eimco Excavator. We gave it the same extra strength for severe service; increased the life and efficiency of working parts thru simplification; gave it I.T.R. (independent track reversal) mobility and "passenger car" power-shift operating ease. Then we put the operator up front where he can see what's going on.

Overhead discharge speeds cycle time; makes it possible to dig, load and dump from one position and do road-work without stopping highway traffic.

With powerful crowding action (39,000 lbs.) the Eimco 105 loads large rocks without secondary blasting usually required when boom shovels or other loaders are on the job.

The Eimco 105 Front-End Loader combines this same high tractor mobility with front end loading versatility for handling scores of different jobs economically.

Write for information on the Eimco 105 Tractor Excavator or Front-End Loader . . ideal highway building tools.

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Cleveland, Ohio Houston, Tex London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-295

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life in 1946, but resumed active duty with the Corps to become area engineer in charge of airfield construction in French Morocco. When he returned to the States in 1955, he was assigned to Ft. Belvoir.

Col. Alcorn is a licensed engineer in Nebraska and a licensed contractor in California.

Stone & Webster appoints project manager in Brazil

Arthur W. Davenport, a superintendent of construction for Stone & Webster Engineering Corp., Boston, has been named project manager for the firm's work in Sao Paulo, Brazil.

Arthur W. Davenport, project manager for Stone & Webster work in Sao Paulo, Brazil.

In Brazil, Stone & Webster Construction Co., an affiliate of the Boston firm, is building a 250,000-kw expansion to the Piratininga Steam Station of Sao Paulo Light, S. A. Servicos de Electricidade.

The expansion will bring the total capacity of the Piratininga Station to more than 400,000 kw.

Davenport had been construction superintendent on company jobs in Virginia and North Carolina.

Richardson to N. Y. office of U. S. Steel division

James A. Richardson has been named contracting manager of the New York office of American Bridge Division, U. S. Steel Corp., New York, N. Y. He was transferred to that post from the St. Louis, Mo., office where he had served in a similar capacity.

Except for four years in the army during World War II, Richardson has been with American Bridge since 1939, when he became assistant to the contracting manager in the Detroit office. In 1946, he went to the division's Chicago office as contracting engineer. The next year he was transferred to Pittsburgh, where he served as assistant contracting manager and then as contracting manager.

Richardson succeeds E. M. Johnson, who has been made contracting manager at the Boston office.

Tunnel, Turnpike group elect Tonti new head

Louis Tonti, executive director of the New Jersey Highway Authority which operates the Garden State Parkway, was elected president of the American Bridge Tunnel and Turnpike Association. Tonti succeeds chairman Weldon B. Heyburn of the Delaware River Port Authority.

Membership of the association represents 70 toll facilities throughout the nation and in Canada. Such major toll superhighways as the New York State Thruway, Northern Indiana Toll Road, Pennsylvania Turnpike and the Garden State Parkway are members.

Minskoff & Sons appoints

Frederick H. Elias has been appointed construction coordinator for Sam Minskoff & Sons, Inc., New York, N. Y. His responsibilities include all physical phases of the firm's building activities, purchasing, administration, and expediting.

Kaiser Engineers elect two vice presidents

Victor E. Cole and W. Frank Bort have been elected vice presidents of the Kaiser Engineers, Henry J. Kaiser Co., Oakland, Calif. Cole will be the project manager responsible to E. T. Larsen, vice president of engineering, for the direction of the engineering and construction work being done by the company in connection with Kaiser's expansion program.

Bort will continue to be responsible for all industrial construction activities on Kaiser's projects within the United States.

Southworth made assistant to NCSA executive director

The National Crushed Stone Association has appointed Bill N. Southworth assistant to the executive director, J. R. Boyd, succeeding R. M. Prewitt who resigned. Southworth has been working with various aspects of the association's activities—public relations, news writing, conventions, organization, and committee work.

Bill N. Southworth, new assistant to the executive director of the National Crushed Stone Association.

The No. 12's part in a good team job

The Caterpillar No. 12 Motor Grader is a key piece of equipment in efficient earthmoving. By leveling fill and building and maintaining haul roads, the No. 12 helps tractor-scraper rigs handle bigger loads in faster time.

The job pictured is at Fogelsville, Pa., where W. E. Johnson had a 231,000-yard contract, relocating nearly a mile of U. S. 22. Smooth haul roads maintained by the Cat* No. 12 Motor Grader allowed three Cat DW21s pulling No. 470 Scrapers to move 4,000-6,000 yards of dirt per day.

In Mr. Johnson's words: "We're Caterpillar people. We've had a lot of experience with Cat equipment and we know when we start a job we can count on finishing it with a minimum of down time."

Construction men everywhere regard the No. 12 Motor Grader as the standard in its field. It is ruggedly built for heavy, round-the-clock work. And its balanced design and dependable four-cycle Cat Engine make it a big producer. Operators like the fast, positive controls, easy blade positioning and unobstructed visibility from the seat. Most tire down time is eliminated by tubeless tires. The exclusive oil clutch operates for many hundreds of hours without adjustment. And in-cab starting, electric or gasoline, is standard.

Ask your Caterpillar Dealer for an on-the-job demonstration. He protects the long work life of the machines he sells with reliable parts and service.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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Here in one booklet is *all* the latest information on the new highway program. Find out how, where and when the money will be spent; standards for the new freeways; final routes of the Interstate System. Everything you need to know to share in the greatest construction job in history.

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Equipment yard (right) is used for both storage and service. Rigs, too large for shop, are dismantled in open. Sub-assemblies are moved into shop for repair, rebuilding, or replacement. Samuel Zara (below) is vice president and general superintendent of Zara Contracting Co., Inc., Hicksville, Long Island, N. Y.

Headquarters shop pays off as . . .

year-around maintenance curbs downtime

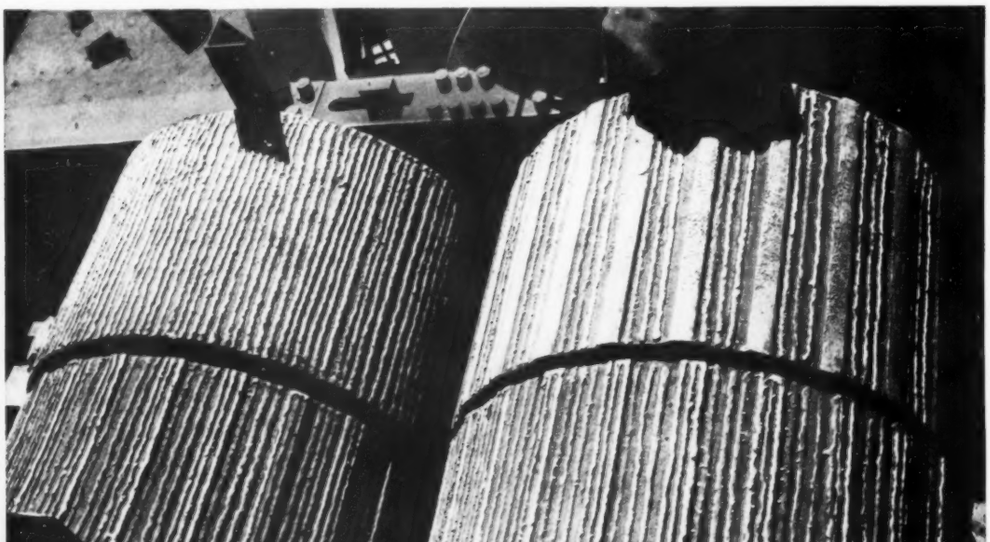
Modern repair facilities insure contractor against costly shutdowns

by DON KING, feature editor

Deferred maintenance is a poor gamble. The only pay-off is trouble. Key machines, deadlined for repair, can upset schedules and tie up high-priced labor. Downtime can wipe out hard-earned profits. The smart contractor, however, insures himself against such losses. He does this by setting up a long-range program for the proper care and handling of his equipment. He implements the program with modern maintenance facilities. And he gives top priority to a well equipped shop manned by experts.

Zara Contracting Co., Inc., has such a shop at Hicksville, Long Island, N. Y. This up-and-coming firm is headed by its founder, Graziana Zara. His son, Samuel, is vice president and general superintendent. Job specialties are sewers and roads in Nassau and Suffolk Counties. A headquarters plant that reflects progressive thinking and good management is a tip-off to the firm's success.

On a plot about the size of a city



To prepare new crushers for a hard life, Wasco County, Oregon, hardfaces rollers with Victor alloy rod. The rollers showed no discernible wear after crushing 3100 tons of extremely hard and abrasive basalt.

Lifesaver for new or used equipment **VICTOR Hardfacing Alloys**

Wasco County, Oregon, uses lots of crushed basalt. This rock crushes readily, yet is extremely hard and highly abrasive, consequently tough on rollers. So, as standard practice, Supt. Wayne Weeks hardfaces all rollers in brand new crushers, before ever they crush a single basalt rock. He reports hardfacing of new equipment prevents excessive wear of surface material, thus maintaining roller size during the work hardening period.

On this new crusher, he used 200 lbs. of Victor #0 semi-automatic wire, size 7/64", to hardface roller faces, and 50 lbs. of tube Victorite coated for finish work around the roller edges. Longer crushing life will quickly pay for the rod.

You, too, can save money and extend the life of equipment subjected to abrasion, impact and heat. Simply make it standard practice to hardface both new and worn equipment with Victor alloy rods. Complete line of 27 different hardfacing rods assures you a right rod for every hardfacing need. Full range of sizes for both acetylene and electric AC and DC applications, either hand, automatic or semi-automatic. Order a supply from your Victor dealer TODAY.

FREE Victor Hardfacing Manual shows you right rod to use and how to apply it. Write us NOW for your copy.

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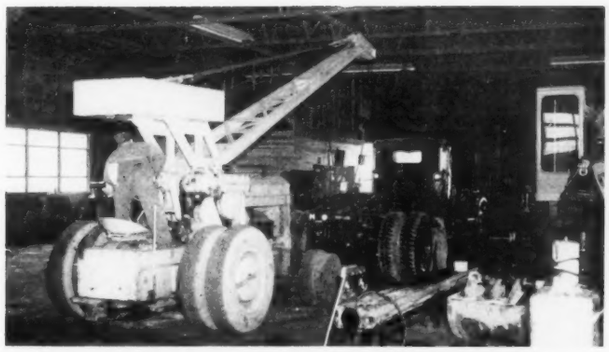
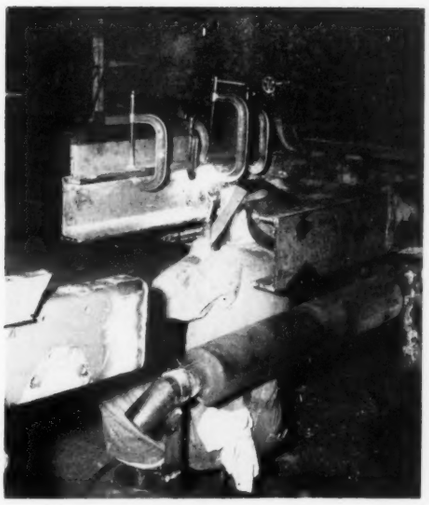
Shop is equipped with modern machine tools that can turn out parts in a hurry. William Heaslip, shop foreman, uses Hendy lathe to cut keyways for outside pulleys on trencher. Zara makes own shaftings, collars, and bushings.





Mobile unit gives lift to rear axle of Brockway 260 truck. Roustabout crane, mounted on J. I. Case tractor (above) is all-around utility item in Zara shop. Conversion of truck to equipment carrier (right) calls for 58-inch extension of wood frame. Additional clearance is needed for mounting Gar Wood winch and gas tank. Shop provides ten hook-ups for electric welding.

block, you see a neat two-story office building. Less than a hundred feet away is the maintenance shop. This is a trim-looking building of modern lines. Its steel frame is enclosed with corrugated steel roofing and concrete siding. Ample space is given over to skylights and windows. Two large overhead doors provide clearance for large rigs. In plan, the building measures about 80×120 feet. Height to top of pitched roof is about 30 feet. Other buildings at the site include a blacksmith shop and several tool sheds.

Well planned yard

Efficient use is made of all available yard space. About 70,000 square feet is divided into maintenance, repair, storage, and parking areas. Pavers, cranes, shovels, trenchers, and other large units are parked here. Maintenance crews dismantle these rigs in the open. The subassemblies are moved into the shop for overhaul or repair. Smaller units are disassembled in the shop.

All equipment and subassemblies are steam cleaned before they enter the shop. This is a labor-saving operation that eliminates the outmoded brush-and-bucket cleaning chore. Stubborn tars, corrosive grime, and dried muck that hamper repair work are blasted away in a matter of minutes. A Malsbary HPC Model 250 steam cleaner is conveniently located on a concrete apron at the main door of the shop.

Prompt and proper care of equipment is Zara's simple formula for meeting work schedules. Minor repairs are made in the field. Mobile repair shops are provided for this purpose. These units are specially equipped trailers that stay with the job until it's completed. Zara also has light mobile units, Ford F600's equipped with acetylene torch cutting and electric welding equipment, that can reach trouble spots in a hurry. Only the rigs that need major repair or overhaul are taken off a job and brought into the shop.

Two-way radio communication

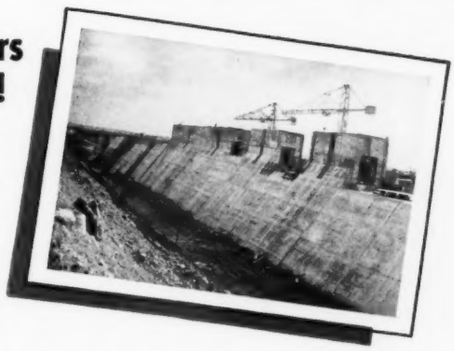
Short-wave radio plays an important role in coordinating field and shop operations. Zara has 14 mobile units equipped with RCA two-way radio. Supers, engineers, and master

(*Continued on next page*)

DEWEY AND ALMY

DAREX Newscope

How Darex AEA saved costly man-hours on St. Lawrence Seaway construction!



Contractors on the St. Lawrence Seaway realized important savings in time and money by adding DAREX AEA to concrete. They found that free pouring, air-entrained concrete needed less spading and vibration. Also, AEA reduced surface accumulation of water, shaving hours from the finishing operation.

DAREX AEA helps provide the top strength and durability Seaway walls require. Air-entrained concrete withstands sea water and cold weather . . . is highly impermeable . . . protects reinforcing steel from corrosion. Shown are Cote Ste. Catherine Locks, built by Canit-Canamount Construction Co.

Daracone "raincoat" protects school from weathering and water damage!

To ward off water damage, the exterior walls of St. John the Evangelist School in Cambridge, Massachusetts, are treated with DARACONE water repellent. Reasons: to protect outside masonry exposed to rugged New England weather from spalling, efflorescence and leakage . . . to cut building maintenance costs. Contractor: R. A. Bossi Co. of Boston. DARACONE Distributor: Littleton Construction Specialties.

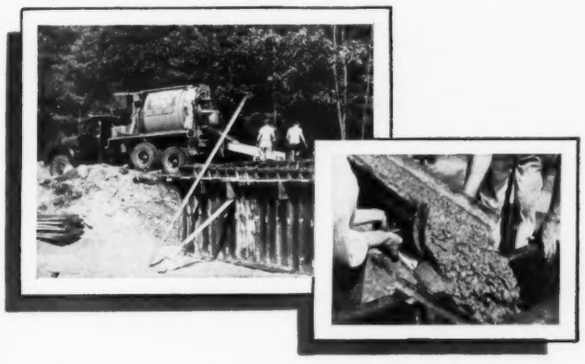
Silicone-base DARACONE penetrates and lines masonry pores and cracks without clogging. It repels water, yet allows the masonry to "breathe." Because DARACONE won't dissolve, wash or wear away, it has been guaranteed by waterproofing contractors for as long as 10 years.

WRDA reduces excess water in concrete, increases workability and strength.

Ready mix plants like Riverside Sand & Gravel Co. of Newton Lower Falls, Massachusetts, are finding that WRDA, Dewey and Almy's new water-reducing agent in easy-to-use liquid form, produces a highly workable concrete mix . . . with top compressive strengths . . . while it cuts water content as much as 20 per cent.

Here's what a Riverside customer, Mr. William Ferro of Camfer Foundations, Lexington, Massachusetts, says about a typical house foundation job in nearby Waltham.

"On jobs like this, where the ready-mix truck can only get to one corner of the forms, I need a high slump concrete that will flow all around the forms without separating. That's why I use Riverside's concrete made with WRDA."



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DIVISION OF W. R. GRACE & CO.

Cambridge 40, Mass. San Leandro, Calif. Montreal 32, Canada

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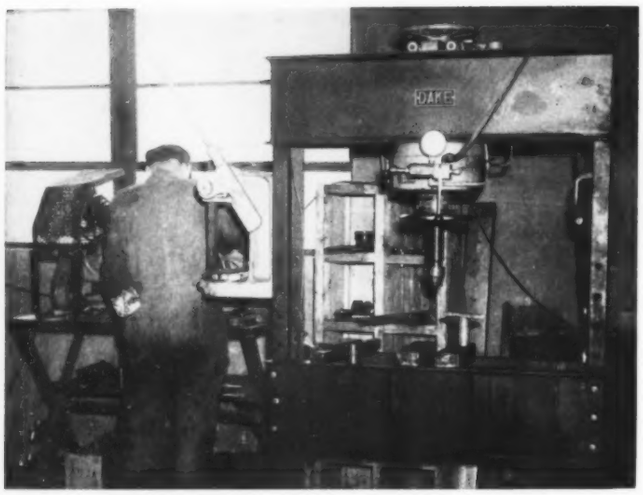

Atlas lathe and Dake hydraulic press find wide use in Zara's maintenance operations.

(Continued from preceding page)

mechanics can contact the headquarters office, equipment trailers, or any supervisory personnel. They can also contact Zara's asphalt plant at Brentwood, Long Island. The base station at Hicksville, with its 125-foot-high tower, has an effective range of about 50 miles.

If a machine is down, and a part is needed in a hurry, the job super radios Hicksville. If the part is available, a pick-up truck rushes it to the job. If the part is not stocked by Zara, a hurry-up call is made to a local dealer who sees that quick delivery is made to the job. Both H. O. Penn Machinery Co. and Ehrbar have nearby parts supplies. So Zara has not had to build up a big parts department of his own. Only the parts that have the greatest turnover are stocked.

There is no off-season in Zara's maintenance program. Adjustments, tune-ups, and emergency repairs keep his shop humming in the work season. Overhauls, alterations, modifications, and major repairs round out the year. These operations take care of 90 per cent of his needs.

Winter maintenance readies the equipment for a fast start in the spring. So Zara's shop is busiest when his field work is lightest. This enables him to keep some of his best field men employed during the slack season. and he is able to retain key skilled labor that would be hard to replace.

Rebuilds own engines

Zara handles all of his own engine rebuilding. He reasons that if he were to farm this work out he wouldn't get the same fast service that he gets in his own shop. Local shops are usually overloaded. Any additional work would require extra men or overtime. So Zara prefers to do the engine rebuilding himself and use as many of his own men as the urgency of the work demands.

Zara's maintenance shop is equipped with five major machine tools: a Mueller Machine Tool Co. drill press, a Famco Machine Co. drill, an Atlas Lathe, a Dake Engine Co. hydraulic press, and a Hendy Machine Co. lathe. Impact wrenches, jacks, drills, pullers, etc., make up the necessary complement of power and hand tools.

Ten hook-ups are provided for elec-

The Equipment Superintendent of the Ohio Turnpike shows how easily the test is made.

A toll gate on Ohio Turnpike . . . one of America's newest highways.

The simple test reveals many things about a vehicle's engine, and individual cards give a permanent record. The Indicator Fluid is covered by Patent No. 2,770,530.

OHIO TURNPIKE REPORTS:

"Greater oil economy . . .
reduced maintenance costs . . .
thanks to the SHELL ADC Oilprint Analysis."

THE OHIO TURNPIKE operates 225 maintenance and patrol vehicles over its new highway to assure *maximum road safety*. The Shell ADC* Oilprint Analysis was recently adopted so that the oil in every vehicle in the fleet can be constantly checked.

With just two drops of oil, the ADC Oilprint Analysis gives a fast, periodic, on-the-spot check of existing oil conditions. Unnecessary oil changes are eliminated, and in addition, costly engine repairs can be avoided when potential engine trouble is revealed. All this is accomplished *in just a few minutes.*

Let a Shell Representative demonstrate the simple application of this program. You'll see for yourself why cost-conscious fleet operators are proving the Shell ADC Oilprint Analysis a valuable preventive maintenance tool. *Trademark

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SHELL

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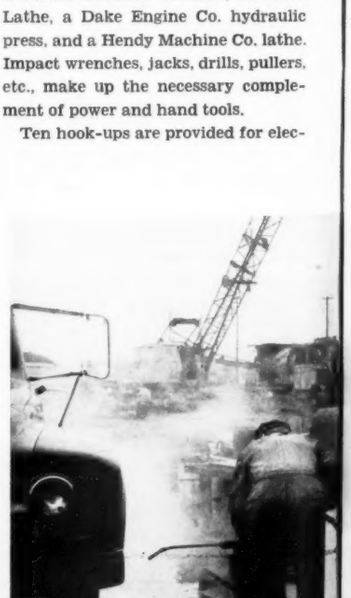


Dirty machines call for heavy-duty cleaning. Malsbary steam gun handles the job. HPC (high-pressure combination) unit is used here for cleaning Ford F900 truck on concrete apron adjoining shop.

Pick-up trucks equipped with 260-amp P&H welder, acetylene-torch cutting equipment, and tools, serve as trouble shooters. Short-wave radio keeps headquarters in touch with mobile units in the field.

tric welding in the shop. These are supplemented by three portable welders—two 300-amp Hobarts and a 260-amp P&H. The P&H is truck-mounted for emergency use on jobs.

William Heaslip is shop foreman and John Brandstein is master mechanic at the Hicksville shop. Staff size varies with the work-load. Year-around average is about six skilled mechanics.

Sewer and road contracts

Zara's current jobs include a Nassau County sewer contract at Baldwin, Long Island, the Peninsula Blvd. highway construction for the State of New York, and asphalt roads for the Veterans Hospital at Northport, Long Island, for the U. S. government.

Zara produces his own asphalt at Brentwood, Long Island. Here he operates a 2-ton-capacity Standard Steel plant that produces 1,000 tons a day. Peak production for a 9-hour day reaches 1,400 tons. Zara also has a stone dock at Glen Cove, Long Island. Trap rock dealers bring the stone in by barge, and Zara hauls it to the job in his own trailers.

Some of Zara's jobs continue throughout the winter season. By breaking through a few inches of frozen soil he is able to operate his trenchers and place 18 to 20-foot sheeting. THE END

Book compiles new arc-welding techniques

A text called "New Lessons in Arc Welding" has been published by the Lincoln Electric Co., Cleveland, Ohio. The material and methods presented in the book were gathered by the staff of the Lincoln Arc Welding School, and are concisely outlined with the latest technical information on the practice of arc welding.

The book is divided into three parts—basic welding information, operating procedures on specific machines, and electrodes manufactured by the company. The welding application supplement contains procedure data for minimizing costs, as well as supplementary information.

Each lesson may be used as an instruction sheet to supplement classwork, or as self-instruction units.

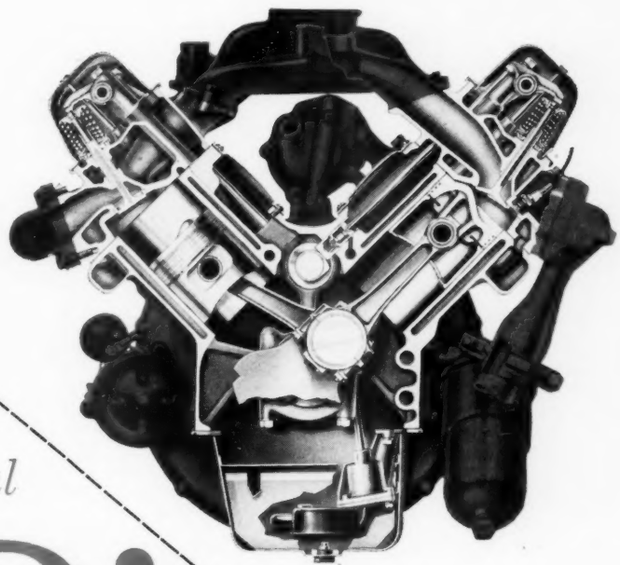
Priced at $1 in the U. S., $1.50 elsewhere, the book may be purchased from the publisher, Lincoln Electric, or through book dealers.

Badger line acquired by Warner & Swasey

The purchase of the Badger Machine Co., Winona, Minn., was completed a little more than a month ago by The Warner & Swasey Co., Cleveland, Ohio. The new owner is preparing plans for the sale of an expanded line of hydraulic excavating equipment.

Managing construction machinery sales for both the Gradall and Badger divisions of The Warner & Swasey Co., Cleveland, Ohio, is I. T. White.

The former sales manager of the Gradall Division of Warner & Swasey, I. T. White, is serving as manager of construction machinery sales for both the Gradall and the Badger divisions. The expanded line—ranging from a small tractor mount to the Gradalls—will be marketed by the former Gradall and Badger dealer setups, which are being integrated and enlarged. The Gradall, in four different models, is being supplemented by Badger's Hopto line.



New International

V-8's

Built to stay on the job longer!

INTERNATIONAL heavy-duty V-8 engines stay on the job long after high stress modified engines have failed to satisfy.

The big difference: INTERNATIONAL V-8's are *built* specifically for rugged, continuous truck operations—and they've proved it since introduction a year ago. Every part, from the heads to the pan, has built-in reserve life. For example: there are exclusive long-life "wet" replaceable exhaust valve guides, fully machined and high efficiency combustion chambers, Y-shaped, deep skirted, rigidly constructed special alloy cylinder block, and many other endurance features that also keep running costs low.

When you buy trucks to make a profit, your logical choice is an INTERNATIONAL, the heavy-duty favorite for the past 25 straight years because they are *built* to stay on the job longer.

They GO on the job! They *stay* on the job! V-8 powered INTERNATIONALS are available with 206, 226, 257 hp. engines—most powerful, most economical you can get. Models from 24,000 lbs. GVW to 76,800 lbs. GCW.

International Harvester Company, Chicago
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

International Trucks cost least to own!

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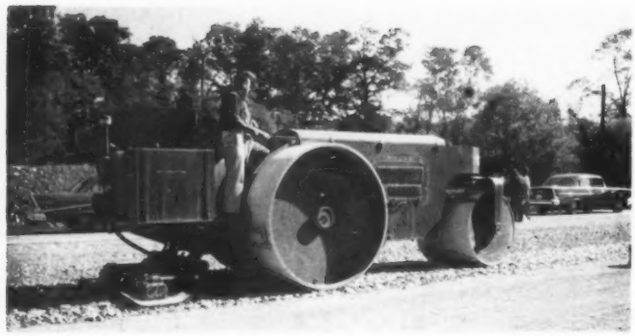


The new pilot test model of the Austin-Western roller-compactor goes to work on a 12½-inch lift of gravel base course. Combining the qualities of a shoe-type vibrator and steel-wheel roller, the rig compacts this lift to 10 inches and reaches the desired density in a single pass. It moves across the roadway width 2 feet at a time.

New roller-compactor nears production stage

Machine combines compactive qualities of shoe-type vibrator, steel-wheel roller

A new development in compacting equipment, first introduced at the Chicago Road Show by the Austin-Western Works, Aurora, Ill., is nearing the stage of actual production.

During the year, the company has been testing a pilot model of its RV-20 vibrator attachment which, installed on an Austin-Western 102 three-wheel roller, combines the compactive qualities of a shoe-type vibrator and a roller.

The Austin-Western roller-compactor, as it is referred to, has been demonstrated in a number of states with very satisfactory results. According to the manufacturer's findings, based on some of the test results, one of the advantages of the roller-compactor is that material can be laid down and compacted in much deeper lifts than are usually required.

Another advantage—made possible by the deeper lifts—is that water haulage and sprinkling needed during compaction can be reduced. This is possible because the deeper lifts are better able to retain moisture. Because of the deeper lifts, motor graders and water wagons can operate more efficiently; they can be used to prepare material ahead of the compacting area instead of standing idle and waiting for many shallow lifts to be placed. One other obvious advantage is that the one machine requires only one operator.

Vibrator attachment

The rear-mounted RV-20 attachment is powered by a 55-hp Ford 172 gasoline engine, and consists of three 450-pound vibrator shoes having an over-all width of 78 inches. These shoes, which can be lowered and raised as needed, operate at about 2,200 vibrations per minute. It has been found that, being attached to a roller, they have greater stability.

One of the tests for the roller-compactor came during a job in Louisiana which called for a Class A sand-clay gravel base course 8 inches deep. This material had a plastic index of less than 8 and an optimum moisture ranging from 9.7 per cent to 11.3 per cent.

The base material, laid in one 8-inch lift along a short stretch of roadway, was compacted in two complete passes by the machine, which used the width of one rear roll (20 inches) each trip. This first trial produced compaction

Unusual Pile-Driving Methods with McKiernan-Terry Hammer Used in Replacing Old Inadequate Bridge

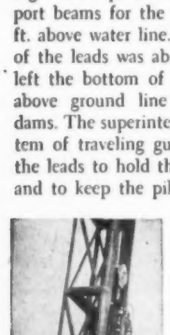
The pile-driving operations to replace the 2-lane 3-span deck truss bridge over Lake Decatur on U. S. 36 with a wider and stronger structure were all performed from the old spans. The new bridge is supported on modified bent pile abutments and solid reinforced concrete piers with concrete pile abutments.

As reported in the August 1956 issue of Roads and Streets by Varel L. Fraley, Bureau of Design, Illinois Division of Highways, who was one of the designers of the bridge, the following unusual method of driving the pier piles in 36 ft. of water was employed, using a McKiernan-Terry 10B3 Double-Acting Pile Hammer:

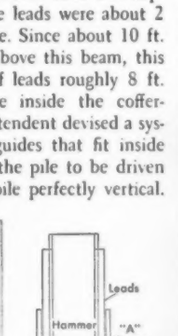
"The leads employed were 40 ft. long. An 'A' frame had been welded on either side of them, in order to allow them to rest and slide on I-beams supported by walers on either side of the cofferdams. There were 20 rows of piles in the footings with 5 piles in each row. The support beams for the leads were about 2 ft. above water line. Since about 10 ft. of the leads was above this beam, this left the bottom of leads roughly 8 ft. above ground line inside the cofferdams. The superintendent devised a system of traveling guides that fit inside the leads to hold the pile to be driven and to keep the pile perfectly vertical.

Aerial view during construction of the piers for the new wider bridge

Driving the cofferdam sheeting



Driving the abutment piling



Sketch showing the unusual method of driving the pier piles

A truck crane was used to handle these sliding guides and the piles.

". . . The hammer was set on the pile above the water line to insure it being properly seated on the pile, then guides, pile, and hammer were all lowered into the water simultaneously, using care to see that the pile remained in the driving head. The bottom guide supported the end of the pile and the weight of the hammer when the guide reached the welded channel bumpers at the bottom of the leads.

"Cables, exhaust hose on the hammer, and load lines were all given 10 or 11 ft. of slack when the bumper was reached. One blow of the hammer then sheared a ⅜-in. pin holding the bottom support for the pile in the traveling guide, and pile and hammer dropped straight down the remaining 8 ft. to ground line. Workmen then made sure everything was clear and ready to drive, and the pile was driven to bearing."

MK380

McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
82 Richards Ave., Dover, New Jersey

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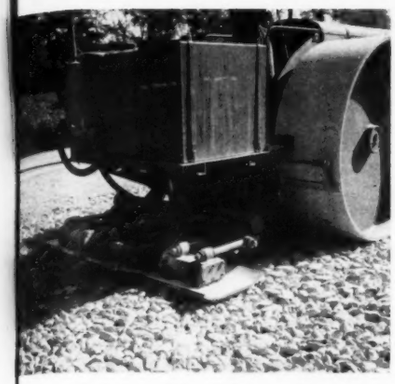

A closeup of the Austin-Western RV-20 vibrator attachment, made to fit the Austin-Western 102 three-wheel roller. The three shoes each weigh 450 pounds and operate at a rate of 2,200 vibrations per minute.

densities ranging from 102.1 per cent to 103.1 per cent of standard. In many sections on the job the required density of 100 per cent of standard was reached in only one pass.

One of the most recent demonstrations took place at York Springs, Pa., where Hempt Bros., Camp Hill, Pa., is relocating 2.8 miles of U. S. 15. About a half mile of State Route 94, at the grade separation connecting with the new road, is being reconstructed as two 24-foot roadways separated by a 4-foot reflectorized concrete divider. This stretch, paved with 2½ inches of asphaltic concrete, has a 10-inch compacted-gravel base course.

This material was laid in a single 12½-inch lift and compacted by the roller-compactor. The machine, for its initial pass, travelled in reverse to allow the vibrator shoes to pass over the base course material before the steel wheels of the roller. The desired density was obtained across the entire width of roadway with a single pass of the roller as it moved across the roadway 2 feet at a time.

The stone base compacted, screenings were spread over it and the operation repeated—the compactor passing over the screenings before the roller. The contractor found that this combination of compactor and roller sealed the voids and left very little loose material on the surface of the base course. THE END

Col. Robertson appointed information head for Corps

Col. Robert R. Robertson has been promoted to chief of the technical liaison division, Office of the Chief of Army Engineers, Washington, D. C., to succeed Col. Roswell P. Rosengren, who is returning to civil life. Col. Robertson serves as the division's staff officer directly responsible to the chief of engineers.

National Slag elects

The National Slag Association elected A. W. Wood president for a second term. C. W. Ireland was also re-elected for a second term as vice president. E. W. Bauman was elected managing director, and W. S. Shaw, treasurer. The organization's members at large of the executive committee are R. O. Dierker, Walter B. Evans, Edward C. Levy, and H. N. Snyder.

For more facts, use coupon or circle No. 215→

During relocation of a stretch of State Route 94 near York Springs, Pa.—when the new rig was recently demonstrated—an International truck-trailer with spreader box deposits screenings over the compacted base course. Compaction then continued with the test roller-compactor. ►

JOB REPORT FROM GOLDSBORO, N. C.

on the new CAT* DW15 (Series E)-No. 428 LOWBOWL Scraper

Whenever a new machine is introduced, this question comes up: "What'll it do on a job?" Reports from actual jobs in different sections of the country show there's a definite answer for you on the new Caterpillar DW15 (Series E)-No. 428 LOWBOWL Scraper. Compared with competitive units of similar capacity, this new earthmover heads the pack with high production.

Here are facts and figures from a contract on U. S. Highway 117 near Goldsboro, N. C. The contract, handled by S. T. Wooten Construction Co., Stantonsbury, involved moving about 3,000,000 cu. yd. of material in a section 2.3 miles long. The material was coarse, moist sand (70%) and clay (30%). Hauling loads of 14.1 bank cu. yd., the DW15 (Series E) unit averaged 7.02 round trips an hour on a 3,600-foot cycle. Details are shown in the box to the right.

From every angle, the new DW15 is designed for high production at low cost per yard. Its Caterpillar Engine packs 200 HP (maximum output capacity). With speeds up to 37.2 MPH plus the stability of four wheels, it delivers fast round-trip hauls with greater safety than two-wheel rigs. Its new wide-section 26.5 x 25 tires provide maximum flotation. And the new No. 428 LOWBOWL Scraper (13 cu. yd. struck, 18 cu. yd. heaped), provides a faster loading rate clear to the end of the loading cycle.

For comparative cost-of-operation figures on other actual jobs, see your Caterpillar Dealer. He's a source of reliable information. Ask him to show you proof that the new DW15 (Series E)-No. 428 can pay off for you! Name the date—he'll demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

JOB DATA ON DW15 (SERIES E)-NO. 428*

Material: Coarse moist sand (70%) and clay (30%)	
Round-trip distance	3,600'
Average load time (min.)	1.06
Average haul time	3.28
Average turn and dump time	.61
Average return time	3.61
Average cycle time (incl. delays)	8.56
Average trips per hour	7.02
Bank cu. yd. per trip	14.1
Average hourly production (bank cu. yd.)	99

**The unit was push-loaded by a D8*

CATERPILLAR*

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ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

THE LATEST, MOST COMPLETE INFORMATION ON THE NEW HIGHWAY PROGRAM — FREE

Here in one booklet is *all* the latest information on the new highway program. Find out how, where and when the money will be spent; standards for the new freeways, final routes of the Interstate System. Everything you need to know to share in the greatest construction job in history.

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Four storage units—Glen Canyon, Flaming Gorge, Navajo, and Curecanti—form the backbone of the Colorado River storage project in the Upper Colorado Basin states. While conserving water for these states, it will deliver water to Lower Basin states and Mexico in accordance with the Colorado River Compact of 1922.

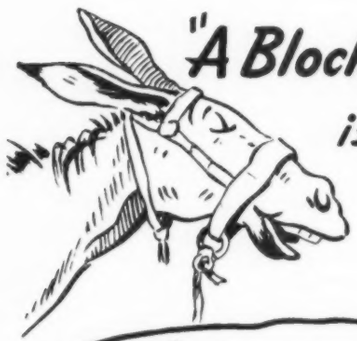
Start made on huge dam ta

With the start of construction at the Glen Canyon and Flaming Gorge dam sites, the huge upper Colorado River storage project is under way.

Planned and supervised by the U. S. Bureau of Reclamation, the project will complete the taming of one of America's longest and wildest rivers, conserving its waters for irrigation, industry, and municipalities, and the generation of more than a million kilowatts of electrical energy.

Flows in the Colorado River at the Utah-Arizona border range from as low as 4 to as much as 22 million acre-feet per year. And to supply equitable distribution of water between the Lower Basin states and the Upper Basin states, huge reservoirs are required in the Upper Basin area.

Four of these storage units, authorized when President Eisenhower signed Public Law 485 on April 11, 1956, are the Glen Canyon Unit on the Colorado River near the Utah-Arizona border, the Flaming Gorge Unit on the Green River near the Utah-Wyoming border, the Navajo Unit on the San Juan River in New Mexico, and the Curecanti Unit on



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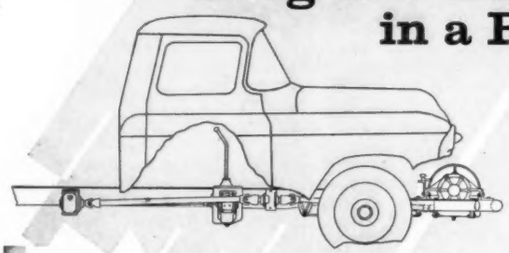

There is a BRADEN front-end winch designed to fit any make and model of truck. Notice in the installation drawing how snug the winch fits into place. Every dimension is carefully calculated to assure proper fit without crowding. Simple instructions make it possible to install winch with the minimum of time and effort.

BRADEN Truck Winches are made in capacities from 6,000 to 100,000 pounds. Specify BRADEN Winches . . . and be sure!

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dam tame upper Colorado River

the Gunnison River in Colorado.

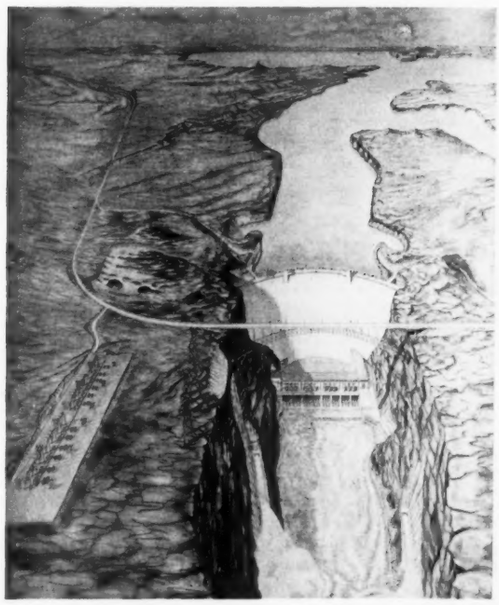
Also authorized were a number of participating water-use projects, which are distributed throughout the Upper Basin states. There is a possibility that as many as six additional water-storage units will be built, supplementing the four authorized under the initial law. The law leaves the door open for other work by specifically providing that additional projects may be added by future legislation. It provides for the authorization of appropriations not to exceed $760 million. As is customary with Bureau of Reclamation projects, most of the cost is to be repaid from revenues over a 50-year period.

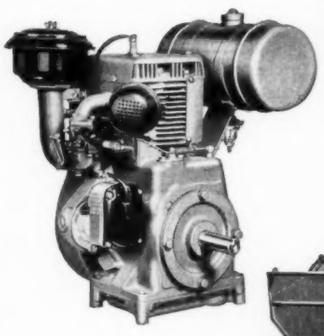
Glen Canyon is key

The key unit in the entire project is the big Glen Canyon dam and power plant already under construction about 15 miles upstream from Lees Ferry in north-central Arizona. This big concrete-arch dam will rise 700 feet above bedrock and span some 1,200 feet between the nearly vertical canyon walls. It will be second in

(*Continued on next page*)

An artist's conception of the key unit in the program, Glen Canyon Dam and power plant. Rising 700 feet above bedrock, it will be second in height in the U. S. only to Hoover Dam. The 186-mile-long reservoir will have a 28-million-acre-foot capacity; the power plant's capacity will be 900,000 kw.





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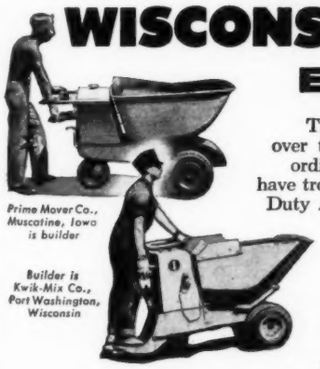

Prime Mover Co., Muscatine, Iowa is builder

Builder is Kwik-Mix Co., Port Washington, Wisconsin

The "power barrows" you see here go over terrain and up steep inclines where ordinary "man-powered" barrows would have trouble. Each husky Wisconsin Heavy-Duty Air-Cooled Engine works Full Time, too . . . day after day, month after month, with minimum servicing.

While heavy duty features are responsible for this kind of *workability*, there's a more basic reason for the success of Wisconsin Engines. Long ago, Wisconsin Motor Corporation decided to build *only* air-cooled engines. No other products would be developed that might draw attention from this one single goal. The plan was sound, for from these undiverted skills and know-how has come a line of engines, unmatched in features, unmatched in *full time power delivery* in the 3 to 56 hp. range.

Write for bulletin S-212, describing all models.

WISCONSIN MOTOR Corporation
World's largest builders of Heavy-Duty Air-Cooled Engines
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SERIES "300" MODEL
Capacity: 320,000 to 375,000 BTU's per hr. Fuel tank capacity, 25 gals.; sufficient for 10 hrs. continuous operation.

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Output: 120,000 BTU's per hr.; 950 cu. ft. heated air per minute. Burns less than 1 gal. low cost fuel per hr.

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Avoid costly delays caused by cold weather; frozen materials and equipment. The Clayton SUMMERAIRE portable space heater provides made-to-order climate — safe, controlled and economical. Summeraire protects concrete against freezing while curing, heats semi-enclosed working areas, insures fast starting of power equipment.

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TWO SIZES; FOUR MODELS TO MEET EVERY NEED

Series "300" models are available with either electric or gasoline engine drive; with or without thermostatic flame control for maintaining pre-set temperatures. Series "120" units provide a highly efficient medium capacity heater. All have outstanding safety features; enclosed, baffled combustion chambers to eliminate open flame hazards; automatic fuel shut-off in the event of flame or power failure; odorless operation with no carbon monoxide release. Ask for prices and complete details.

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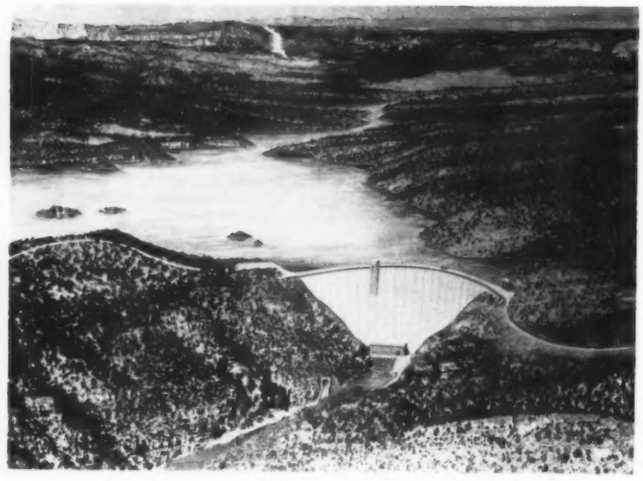


A drawing of Flaming Gorge Dam and reservoir, superimposed on an aerial photograph of the site. It will rise 500 feet above bedrock and stretch 1,100 feet across the canyon.

height in the U. S. only to Hoover Dam, some 370 miles downstream on the lower Colorado River.

The reservoir, backing 186 miles up the canyon, will have a storage capacity of 28 million acre-feet of water. The power plant to be built at the base of the dam will have an installed capacity of 900,000 kw.

Since this is the key unit of the project, it has been given some priority by the Bureau of Reclamation. The right bank diversion tunnel has already been excavated under a preliminary contract. Access roads to both sides of the canyon are under construction, together with a $4.1 million steel-arch bridge spanning the deep canyon. An access road is also being built from Kanab by the State of Utah. Streets, utilities, and homes are under construction at the townsite near the dam.

Until a few months ago, the town of Page was just a spot on the Navajo Indian Reservation—a piece of flat, barren mesa with a few sparse sprigs of sagebrush and an occasional rattlesnake. The Bureau made a deal with the Navajos for the area and named the town Page in honor of the late John C. Page, Commissioner of Reclamation from 1937 to 1943.

With these preliminaries under way, the largest single contract ever awarded by the Bureau—for $107,955,122—went to Merritt-Chapman & Scott Corp., New York City, for the construction of the dam and powerhouse. This is also the largest contract ever awarded a single firm and the largest awarded for a dam. Yet it was substantially under the Bureau's $135.6 million estimate and more than $10 million under the next lowest bid.

M-C&S, which immediately began marshaling forces and equipment, is already well started on the first phases of the seven-year job.

Start work at Flaming Gorge

Invitations for bids for the prime contract at Flaming Gorge, the second of the storage reservoirs, are expected to be issued next month, with bids being taken in the spring and work to get under way early next summer. Because of the high altitude and the extremely rugged terrain at the dam site, which may make access difficult in winter, the Bureau invited prospective bidders to visit the site during the late summer and fall. Many of the major contractors in the western part of the country, and from the central and eastern areas, have done so in the past few months.

The Flaming Gorge dam site is on the Green River, a principal tributary of the Colorado, about six miles south of the Utah-Wyoming boundary. The 4-million-acre-foot reservoir will extend 94 miles upriver to within a few miles of the city of Green River, Wyo.

The thin-concrete-arch dam will extend 1,100 feet across the deep canyon and its crest will rise about 500 feet above bedrock. Preliminary estimates indicate that the contract will require the excavation of 225,000 cubic yards for dam and power plant foundations. The structure will contain a million cubic yards of concrete, five million pounds of reinforcing steel, and more than four million pounds of metals in such things as gates, penstocks, and hoists.

The Flaming Gorge powerhouse will be built to accommodate three 36,000-kw generators.

Preliminaries are already well under way on this project: access roads, and townsite and housing facilities are being built under a series of con-

For more profitable aggregate production

HERE'S WHY YOU SHOULD BUY CEDARAPIDS

YOU GET GREATER TONNAGES — Each Cedarapids component is designed for big capacity that can't be matched by any comparable unit. Combine these big-output components in your Cedarapids engineered stationary plant and watch your tonnage figures soar to more profitable heights!

MAINTENANCE IS LOWER — Every Cedarapids component is *quality-built*, with many parts heat treated and stress relieved to give long years of productive service. The money you save on fewer repairs and minimum down time is pure profit!

HANDLE ANY AGGREGATE PRODUCING JOB —With specifications increasingly strict, the producer whose plant is *engineered to his specific job* will profit most. In the complete Cedarapids line, there's a size and type of component to meet your specifications in any volume desired.

PLANTS ARE "TAILORED" TO THE JOB — Field-experienced Cedarapids engineers help you select the components most effective for your particular job conditions, and combine them to give you *extra* capacities of specification products.

CEDARAPIDS PRIMARY CRUSHERS

Big 4248 Cedarapids Jaw Crusher with Vibrating Grizzly

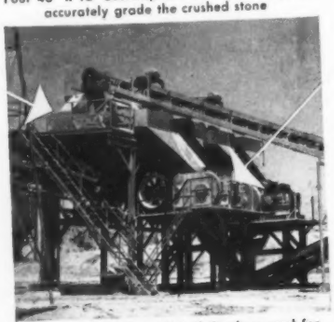
To meet primary crushing needs, Cedarapids offers Single Jaw or Twin Jaw Crushers and Double Impeller Impact Breakers in a complete range of sizes. Used as large separate units, or in portable plants, all Cedarapids crushers are engineered for the highest capacity and long, trouble-free life. The addition of vibrating grizzlies or scalping screens greatly increases production for more profitable operation.

Two 3042 Double Impeller Impact Breakers used for primary reduction

Four 48" x 12' Cedarapids double deck Screens accurately grade the crushed stone

CEDARAPIDS HORIZONTAL VIBRATING SCREENS

Horizontal Vibrating Screens give 12% more effective screening area than inclined screens of the same length, plus 20% to 30% more effective gradation. With the horizontal position of the screen and almost vertical fall of material, the full area of each screen cloth opening is available for material to pass through.



Two 4024 Cedarapids Roll Crushers used for secondary crushing in this efficient stationary set-up

CEDARAPIDS SECONDARY CRUSHERS

Six sizes of Cedarapids Roll Crushers meet your requirements for big volume production of smaller sized aggregates at low cost. For secondary crushing of limestone, Cedarapids Hammermills produce a much finer quality of products, and size for size, turn out more tons per hour than other similar types of equipment on the market.

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● With the increasing demands for specification aggregate to meet the needs of the roadbuilding program, it will pay you to take advantage of Cedarapids quality-built equipment and engineering service. See your Cedarapids dealer today, or write for full information.

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Cedar Rapids, Iowa, U. S. A.

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tracts awarded by the Bureau of Reclamation and state and federal highway agencies.

Navajo Unit

At the Navajo site in northern New Mexico, a large earth dam will back up the muddy San Juan River to form a reservoir 35 miles long and with a capacity of 1.7 million acre-feet. The big earth dam will be about 425 feet high and 3,800 feet long and will require the placement of about 33 million cubic yards of embankment.

The access road to the Navajo site is just now being completed by the New Mexico State Highway Department with part of the funds being furnished by the Bureau of Reclamation. Bids for the dam itself will be taken soon. This will be a storage and irrigation reservoir only, with provision for the future addition of a power plant.

Curecanti Unit

The fourth storage unit of the project, the Curecanti Unit, will store water in the deep canyon of the Gunnison River. This unit, still under study, may be a series of dams, power plants and reservoirs. When the feasibility report has been completed, plans will be prepared and the unit will be put under construction as early as possible.

Participating projects

Scattered throughout the Upper Basin states are eleven participating projects for the development of irrigation or other water-use facilities. More participating projects will undoubtedly be authorized as the water becomes available. No money has yet been appropriated for construction on the participating projects, but they are expected to follow as soon as construction of the storage units is well under way.

With the storage units and participating projects, the Upper Basin states will be able to further their use of the water allocated to them by the Colorado River Compact of 1922. At the same time they will be able to deliver to the Lower Basin states and Mexico the amount of water to which they are entitled under the Compact.

THE END

U. S. Steel film honors engineers and contractors

A new film called "Jonah and the Highway" has been released by United States Steel Corp., Pittsburgh, Pa., as part of the firm's "keep-our-roads-on-the-go" program. This 27-minute film was designed specifically to focus public attention on the building of the nation's projected highway network. It demonstrates the importance of this program.

"Jonah and the Highway" pays tribute to the highway engineer and the contractor. Actual construction shots were filmed on highway projects in Los Angeles County. The film is scheduled for showings in movie houses throughout the country, and within a year, it will be released in 16 mm showings to groups and organizations.

Blacktop industry story featured on television

Los Angeles, Calif., TV viewers were given a short course in asphalt plant operation, blacktop production, and asphalt highway building when "Success Story", a half hour weekly show on KTTV, featured Industrial Asphalt. The program originated from Stanton, Calif., the site of Industrial's 26th plant in Southern California.

The asphalt plants viewed were built by Standard Steel Corp., Los Angeles, and include 4,000, 5,000, and 6,000-pound semi-portable units and also the new 2,000-pound TM trailer-mounted, completely portable plant. The narrator followed the TV cameras closely, explaining the manufacturing process. Close-ups and panoramic views followed raw material from storage at the plant site to the Standard Steel 4,000-pound asphalt plant. The actual laying of hot asphalt mix on a strip of grade concluded the program.

Kinescopes of the show are available on loan to groups interested in roadbuilding from Industrial Asphalt, 110 S. Beverly Drive, Los Angeles 35, Calif., and from Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 58.

Next Road Show in 1963

At the request of CIMA president, Clarence Killebrew, a ballot was mailed to the entire membership asking them to vote on a preference date for the next Road Show.

About 80 per cent of the membership responded to this questionnaire, and 74 per cent of the members voting asked for a show in 1963 or earlier. When the returns were analyzed, it was unanimously agreed that the next Road Show of the Construction Industry Manufacturers Assn. will be in January or February, 1963.

Duff-Norton Co. appoints

P. J. Baltes has been appointed Ohio district sales manager for Duff-Norton Co., Pittsburgh manufacturer of industrial jacks and hoists.

He has headquarters in Cleveland, and will direct sales activities in the general industrial field for the Duff-Norton Jack Division and Coffing Hoist Division.

COLD FACTS...

about "JAY" tamping efficiency

From Alaska* to South America, from Canada to Florida, contractors records prove Jay best for year round work.

HERE'S POWER TO SPARE

The same power that lets you compact at up to 90% savings all summer long is working for you in the winter too. The "JAY" Model 12 operates at 2300 R.P.M. delivering 1800 pound blows or equivalent to approximately 4,000,000 pounds of force per minute to properly compact and keyseat materials to maximum procter densities. As shown in picture A, a "JAY" Tamper Model 12 is compacting non-frozen selected backfill in Rochester, Minnesota in dead of winter.

"JAY" TAMPERS KNOW NO SEASON

No air lines or Hoses to freeze, clog or get stiff with cold.

No frozen radiators. All "JAY" models are air cooled.

No batteries to replace. "JAY" Tampers are magneto equipped.

Works well with cold hands. All carburetor settings and blade changes can easily be done with a gloved hand.

"JAY" model 12 tamper compacting backfill during winter operation in Minnesota.

"JAY" model 36 tamper compacting close to concrete piling on highway interchange job.

*Contractor list upon request.

"JAY" Tamper model 12 with standard 18" tamping shoe.

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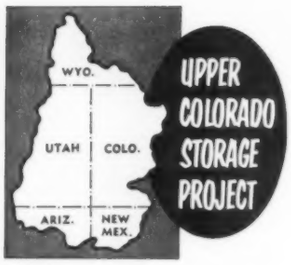


Glen Canyon access road rushed to completion

Streets, utilities, buildings, homes under construction by several firms are creating a new city near the dam site

By RALPH MONSON
field editor

Gravel for base and hot-mix courses is loaded into an International 10-wheel dump truck by a Lorain shovel, one of two rigs working the pit. Since the pit was deficient in fines, scrapers spread caliche fines over the pit before the shovel started loading.

Placing 121,000 tons of asphaltic concrete in about 81 calendar days to surface 25 miles of highway and a 4,500-foot airstrip was the remarkable achievement of Alexander Construction Co., Inc., Minneapolis, Minn.

Construction of the access road, airstrip, and municipal facilities at Page, Ariz., on the left bank of Glen Canyon, form preliminary projects being rushed to completion as work gets under way on the prime contract for the dam.

This section of highway, designated U. S. 89 Alternate, is needed for the transport of thousands of tons of cement, steel, and other materials needed at the dam site. It is the major link between the east or left side of the canyon, and U. S. 89 leading to the railhead at Flagstaff, Ariz. The highway will be continued across the Colorado River Bridge, being built at the dam site, to join a 72-mile section

This Cedarapids Commander crushing and screening plant is one of a pair producing material for the base and hot-mix. Trucks load to a 36 ×10 apron feeder; a Cat D8 tractor with U-dozer moves finished material from plant to stockpile.

On the opposite side of the base aggregate stockpile, a feeder and belt carry the material to a Barber-Greene 848 continuous pugmill mixer. Here water is added to give the dry aggregate a higher moisture content before it is loaded into the Kenworth truck.

Base material is pushed ahead on the new access road by a Cat D8 tractor dozer. Since trucks are unable to operate in the soft sand, they back up to the edge, then dump their loads for the 38-foot-wide base.

As the base is shaped to grade by a Cat No. 12 motor grader, a 6-inch lift is compacted by a Ferguson 25-ton self-propelled roller. The high rate of evaporation sometimes made it necessary for water to be added for compaction.

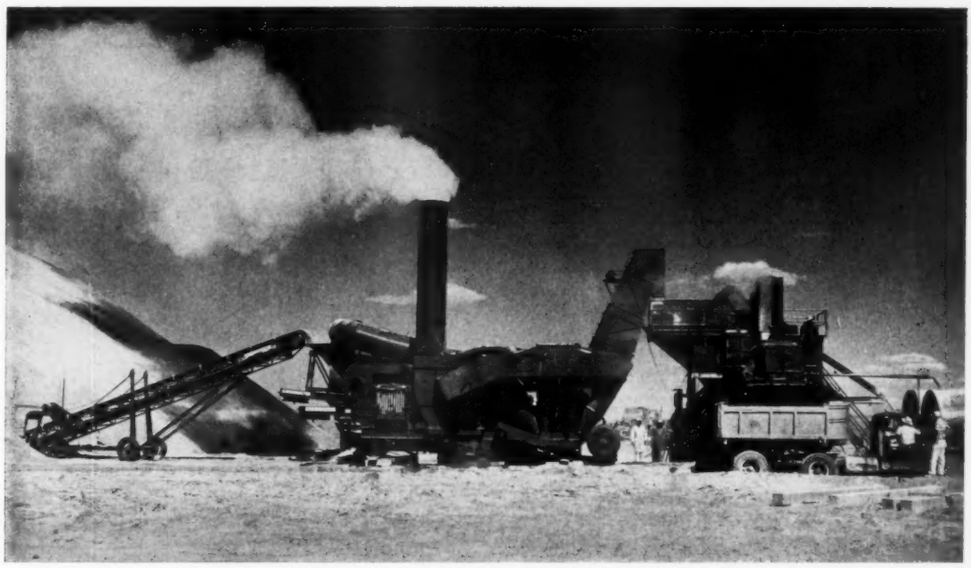
of highway under construction from the west side of the canyon to Kanab, Utah.

Prior to Alexander's contract, two other firms had graded the section of road. Strong Co., Inc., Springville, Utah, graded a 4.6-mile portion which included a spectacular 300-foot-deep cut through the Echo Cliffs near U. S. highway 89. W. W. Clyde Co., Inc., also of Springville, graded the remaining 20.8 miles and built a bridge over Waterholes Canyon to complete the new alignment into Page.

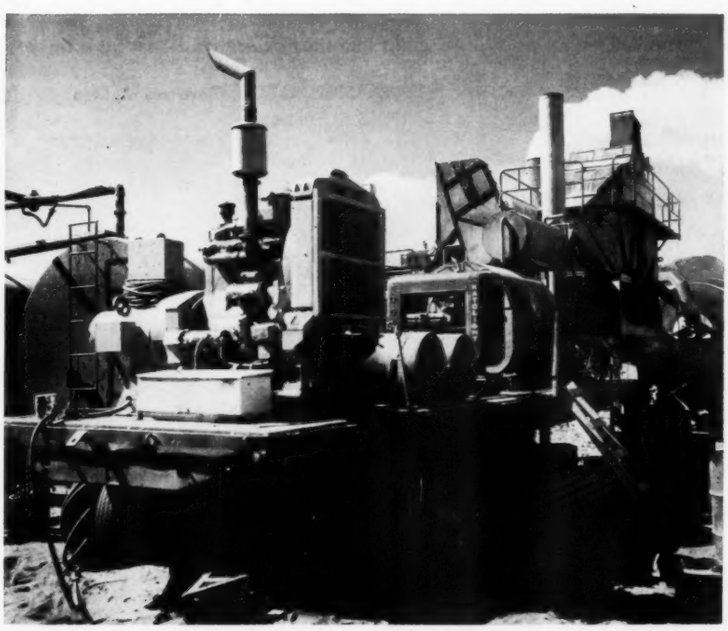
Cut through Echo Cliffs

For many miles east and south of its crossing of the Colorado River at Marble Canyon, Ariz., U. S. 89 follows the base of a row of high cliffs known as Echo Cliffs. Between Marble Canyon and The Gap, Ariz., 40 miles to

(Continued on next page)



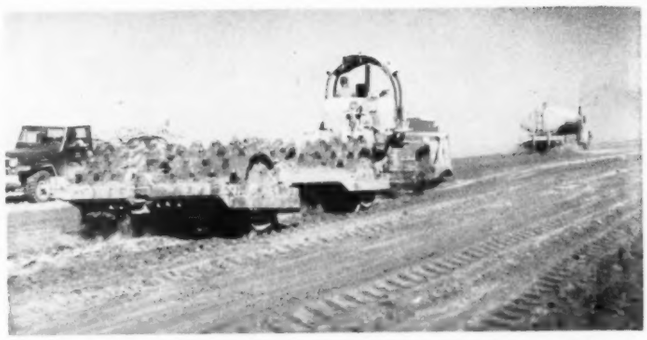
Production of 325 to 350 tons of hot-mix hourly was achieved by this latest model Barber-Greene asphalt plant, which is rated at 200 tons per hour. The high-speed pugmill, and the very dry aggregate, made it possible for crews to place an average of 2,000 tons daily.



Power for the hot elevator and screen of the B-G plant is supplied by the Cummins 75-kw diesel-generator set on this trailer. The trailer also carries a Katolite generator to power the Childers hot-oil heater which heats the asphalt for the plant.

Big dump trailers deliver the hot-mix to Barber-Greene finishers on the road. The finishers lay two 9-foot-wide strips simultaneously to complete half of the 36-foot surfacing.

The 114,000-yard earthwork job for the Manson Mesa Airport at Page is handled by Haumont Contracting Co., Phoenix, Ariz. The Euclid S-18, aided by a Cat D9 push-tractor, is loading rocky material in the 4,500×500-foot runway area.



As the Autocar diesel water truck applies water to the earth from a 4,000-gallon tank, the grade is thoroughly compacted by two LeTourneau-Westinghouse sheepsfoot rollers pulled by a Cat D8.

(*Continued from preceding page*)

the southeast, these cliffs formed an impenetrable barrier that has now been pierced by the new access road that formed a difficult and spectacular grading project.

Of the 1,193,000 cubic yards of excavation in Strong's grading contract, 500,000 were in this one cut which was 1,500 feet long and reached a maximum depth of 300 feet. Using a Winter-Weiss Portadrill, the contractor drilled 6½-inch holes in 40-foot lifts for the blasting. A five-to-one ratio of ammonium nitrate to dynamite did an excellent job of breaking up the rock, yielding a yard of rock for each ¾ pound of explosives.

In the early stages of the cut, the material was worked over the edge of the cliff by a Caterpillar D9 tractor-dozer. As the cut deepened and the fill was built up, a pair of Caterpillar D8's with 80 scrapers joined the operation.

As with other road jobs in this area, water was a problem. Strong had to bring the required water 20 miles or more from Lees Ferry, Ariz., in a 7,000-gallon tank truck. This project was started in the fall of 1956 and was completed last fall in time for the surfacing contractor.

Producing base aggregates

Moving in to the gravel pit at Page last July, Alexander Construction Co.'s first job was to produce aggregates. The pit, adjacent to the airstrip site at Page, contained a good supply of suitable gravel but was deficient in fines. A nearby caliche deposit provided a source of fines.

A subcontractor, Haumont Contracting Co., Phoenix, Ariz., moved the caliche with a spread of scrapers, placing a blanket 3 to 4 feet thick over the pit. A 2½-yard shovel and a Lorain 1-yard then worked a face of about 20 feet in the pit, mixing the caliche as they loaded the fleet of trucks hauling to the crushers.

At one edge of the pit, the contractor set up two Cedarapids Commander crushing and screening plants side by side. Ahead of one of these was set a Cedarapids 18×38-inch primary jaw crusher. When large sizes of rock were encountered in the pit, the material was run through the primary. Most of the gravel, however, could be fed directly to the Commander plants.

In both setups, the trucks hauling

EUCLID "TWINS"

whip tough conditions on Sugden & Sivier's 1,700,000 yd. road job

Two TS-24 "Eucs" move 320 yards per hour on 3300' haul with 3% adverse grade and 16 to 20% rolling resistance

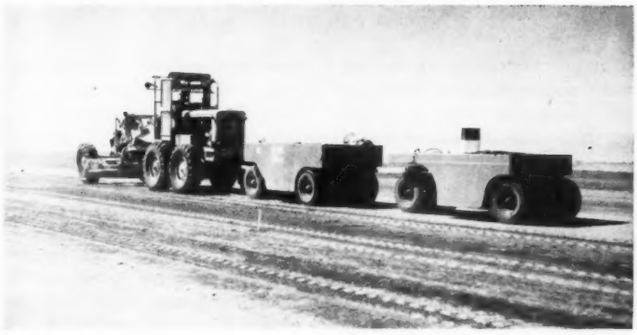
On a 1,700,000 yd. highway relocation job near Jackson, Michigan, Sugden & Sivier encountered the toughest dirt conditions in their experience. Yet, they're ahead of the earthmoving schedule—*chiefly because of the performance of their six Euclid Twin-Power Scrapers* (two 24-yd. struck capacity and four with 18 yd. struck capacity).

Water-logged sand pockets in the clay base made loading and hauling slow and difficult. In spite of the unfavorable conditions, the all-wheel drive "Twins" bulled their way through on wet, spongy, rutted haul roads . . . and averaged 1500-1600 yards per unit per 10-hour shift.

On all kinds of jobs, in every kind of dirt, on all lengths of hauls, Euclid "Twins" are outproducing other scrapers by a wide margin—the all important profit margin. More and more successful bidders are figuring their estimates on "Twin" productive capacity. See your Euclid dealer soon for additional details and proof that ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Charles T. Sugden says,
"Euclid manufactures the best earthmoving equipment available today."



Binding up the subgrade surface to support equipment placing base material is a job for BMCO and Rosco 9-wheel pneumatic rollers. They are pulled in tandem by an Adams grader, used when the going became tough in the loose sand.

from the pit dumped into a 36-inch× 10-foot apron feeder which carried the gravel to a belt conveyor supplying the crushing plants. One of the plants produced minus-¾-inch material for the bituminous concrete while the other made minus-1-inch base material. Two Caterpillar D8 tractors wtih U-dozers carried the finished material away from the crushers and built stockpiles that supplied the hot-mix and stabilizing plants. The plants' per-hour production came to about 300 tons of base material and 250 tons of hot-mix material, respectively.

On the opposite side of the base aggregate stockpile, a feeder and belt carried the material to a Barber-Greene Model 848 continuous pugmill mixer. Here water was added to the bone-dry aggregate to produce a moisture content of 7 to 8 per cent. The thoroughly blended material was fed into a fleet of big dump trailers pulled by Mack, Kenworth, and GMC trucks.

Pump water from river

The mixing operation was relatively simple and routine, but getting a supply of water to the plant was quite a different story. The only available water was in the Colorado River at the bottom of a vertical-walled canyon more than 800 feet deep. Even this water carried a high volume of very abrasive suspended matter.

To get the water from the river, Alexander followed the precedent set when W. W. Clyde & Co. built a pumping plant at the river's edge and ran a pipeline to the plant. After selecting a site in the canyon for the pumping plant, Alexander built an inclined cableway from the top of the canyon to the river's edge. This was the only means of access to the bottom of the canyon.

The contractor had a Stang 8-inch pump draft the water from the Colorado River to a settling tank on a shelf at the river's edge. A 6-inch pump took the water from the tank and delivered it to the suction line of a four-stage jet impeller pump which raised the water through a 4-inch steel pipeline to the top of the canyon wall, 856 feet above the river level.

At the top of the bank, two Gorman-Rupp 6-inch pumps powered by Chrysler industrial engines alternated to raise the water an additional 250 feet and push it through two miles of 4 and 6-inch steel pipeline to the plant site. A storage reservoir at the plant site provided a reserve to keep the stabilizing plant in operation in case of failure in the water supply system.

The engines driving all of the pumps were powered with liquefied petroleum gas. Those located at the bottom of the canyon were fed from tanks at the top through a run of ½-inch copper tubing. All of the pumps were rented from Stang Wellpoint Co.

Placing base

Some portions of the subgrade of the new road, built entirely of sand, would not support the weight of the trucks loaded with base material. In fact, some spots were so soft that a motor grader could not operate over them. This, of course, complicated the placing of the base since the trucks were forced to stay on the area where the base rock had already been placed.

The base-laying operation started at the end nearest the plant. The trucks traveled out over the base already laid, turned around, backed out as far as possible, and dumped their loads in a pile on the sandy subgrade. A Caterpillar D8 tractor-dozer then pushed the material ahead, spreading it over most of the width of the road so the next truck could back over it. Since the 38-foot-wide roadway was

←For more facts, circle No. 222

Independent hydraulic control of apron and ejector on the big "Twin" assures instant response to simple control levers . . . permits fast, controlled spreading of the load . . . eliminates expense and downtime caused by cable breakage. Interchangeable, reversible four-section cutting edge can be adjusted for best loading in various materials.

"Downtime is negligible on the Twins"

That's the opinion of Mr. Sugden, a 34-year veteran in earthmoving. And, there's good reason for the high availability of "Eucs". Strength and durability are designed in and built in to every unit as a result of over 25 years of experience in building heavy construction equipment. Major components are job-proved over many years—and they're easily accessible for quick service or replacement to save downtime.

With 300 h.p. engine in the tractor and 218 h.p. behind the bowl, separate Torqmatic Drive and NoSpin differential for each drive axle, the TS-24 "Twin" cuts cycle times even under the most adverse job conditions.

Euclid "Twins" are moving the cheapest dirt!

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

A 300-foot cut through Echo Cliffs was the toughest part of grading the access road to the town of Page at the Glen Canyon dam site. Here, the road bed is about two-thirds to grade. Some 500,000 of the 1,193,000-yard excavation was in this 1,500-foot-long cut. Strong Co., Inc., Springville, Utah, had the contract.

(Continued from preceding page)

too narrow for the trucks to turn around, and since it was difficult to build turning areas in the soft desert sand, the trucks frequently backed as much as half a mile to dump their loads.

A Caterpillar No. 12 motor grader worked the base material over and laid it out to full width and finished grade. Compaction of the single 6-inch lift was accomplished by a Ferguson self-propelled 25-ton pneumatic roller. Because of the high rates of evaporation in the hot, dry weather, some additional water had to be added to the surface with a tank truck to obtain proper compaction and binding.

All hauling had to be done through the other operations, complicating them. It was especially difficult to get a good prime coat without the material being picked up on the wheels of the trucks hauling the base rock.

The contractor solved this problem by applying the prime of 0.2 gallon per square yard of MC-2 cutback asphalt on Saturday mornings. No base material was hauled on Saturday or Sunday. By Sunday night, when the prime had fairly well cured out, the surface was blotted with sand. The trucks then traveled over the primed base without harming it. Excess sand and dirt were swept off ahead of the paving operation by a Minneapolis-Moline tractor equipped with a Lull front-end broom.

Big paving plant speeds work

By the time the base work had progressed enough to permit surfacing to start, it was September 10. The contract required completion of the surfacing by November 30. That left a total of 81 calendar days to place all of the bituminous surfacing. But the contractor, never doubting that the work would be completed on time, depended on the big new Barber-Greene 848A plant to turn out the mix as fast as two Barber-Greene pavers could lay it down.

This hot-mix plant was set up beside the aggregate stockpile where it could be fed by the dozers building the stockpile. A trap with a 30-inch reciprocating feeder delivered the materials to a 30-inch×51-foot belt conveyor feeding the 108-inch×20-foot dryer. Since the material usually contained less than half of one per cent of water, the dryer really only had to heat it to the desired temperature.

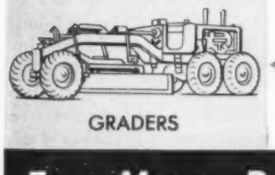
Hot material from the dryer was carried by bucket elevator to the 4×14-foot, 3½-deck screen of the gradation unit and then to the four compartments of the 30-ton storage bin. This new plant had very accurate control of the gradation and the supply of each size. Lights at the operator's platform flashed on to indicate a low supply in any of the bins. This circuit can be connected to stop the mixer when the supply of any size gets too low.

Apron feeders and calibrated gates provide extraordinarily accurate measurement of the aggregates entering the pugmill. The metering of the asphalt through a gear pump provided equally accurate measurement of the bitumen, with the result that the mix was maintained within very close tolerances of the design mix.

Although the plant is nominally rated at 200 tons per hour, the very dry aggregate and the new high-speed pugmill combined to push rates between 325 and 350 tons per hour. Even with all of the usual delays, 2,000 tons of mix were turned out in a 10-hour shift.

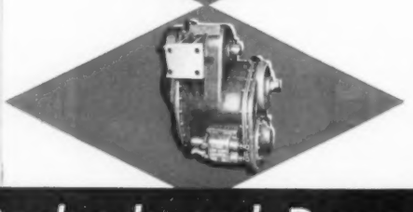
Asphalt cement was shipped by rail from a Standard Oil refinery near Los Angeles, Calif., to Flagstaff, Ariz., and then hauled the remaining 135 miles to the plant in four 6,400-gallon truck-trailers. When running at full capacity, the plant used at least five

LOADERS


GRADERS

MODEL RT-585

POWER SHIFT TRANSMISSION — just one of several models we manufacture for loaders covering a horsepower range of 65 H.P., 100 H.P., 150 H.P. Four-speed forward and reverse, all clutch shifting type.

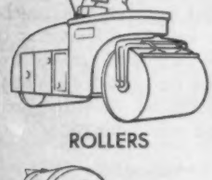


MODEL RT-594-B

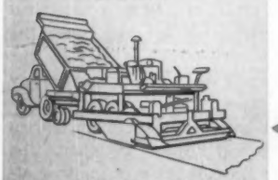
POWER SHIFT TRANSMISSION with 6 speeds forward—6 speeds reverse. Shifting of speeds and reversing accomplished with oversize hydraulic clutches running in oil.

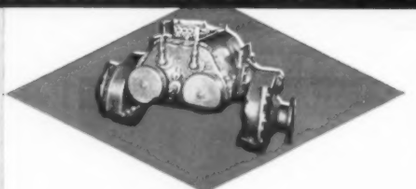
For More Payloads and Dependable Service
T&G TRANSMISSIONS . . . T&G AXLES

TRACTORS


ROLLERS

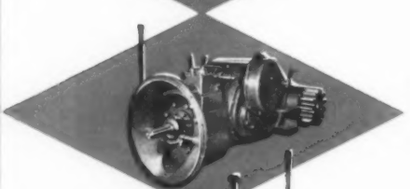
MIXERS


PAVING EQUIPMENT



MODEL AT-593-A

POWER SHIFT TRANSMISSION & AXLE with *counter-rotation*, 4 speeds forward and reverse, hydraulic clutches designed to withstand severest service.

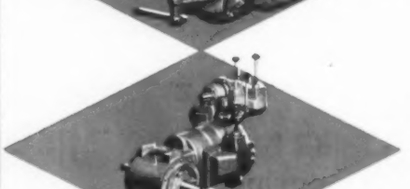


MODEL RT-505

ROLLER TRANSMISSION with 3 speeds forward and reverse. Transomatic design features unitary construction for low upkeep, long life.

MODEL MH 45-D-50

TRUCK MIXER TRANSMISSION — six other models available including a *front end power take off drive* with hydraulic disengaging clutch. Our Model RT-633 suitable for front end PTO drives, cross drives, or side-mounted engines.



MODEL RT-614

HEAVY DUTY TRANSMISSION — 18-speed, forward and reverse. Six other models available for concrete finishers, spreaders, blacktop pavers, etc.

Submit your power transmitting requirements — no obligation for engineering services.

THE TRANSMISSION & GEAR CO.
10421 HAGGERTY AVENUE • DEARBORN, MICHIGAN

OTHER TRANSMISSIONS FOR FORK LIFTS, SHOVELS, CRANES, SWEEPERS, STATIONARY MIXERS • HEAVY DUTY REAR AXLES, PLANETARY TYPE AXLES — RIGID AND STEERING TYPES • LOCOMOTIVE TRANSMISSIONS AND HOISTING EQUIPMENT AND SPEED REDUCERS

For more facts, use Request Card at page 18 and circle No. 223

loads per day, and the trucks were really kept busy.

At the plant, a Viking asphalt pump powered by a Wisconsin engine pumped the asphalt over into the 22,000-gallon storage tanks. These and transfer equipment were heated by a Childers Model D-100 hot-oil heater.

Power for plant operation was supplied by a combination of diesel engines and electric motors. An International 1091 diesel drove the dryer and the big 16-cone dust collector. The pugmill mixer and feeders were powered by an International 18A engine. Electric power for the screen and hot elevator was supplied by a Cummins 75-kw diesel-generator set. A gasoline-powered Katolite generator operated the hot-oil heater.

Laid in four strips

The hot bituminous mixture was hauled to the road by a fleet of dump trailers under a subcontract to James Bond Trucking Co., Phoenix, Ariz. Bond also supplied the trucks for the base haul, using as many as 50 of the big truck-trailer combinations as the haul became long.

On the road, two Barber-Greene pavers laid the hot-mix in four 9-foot-wide lanes to build the 36-foot-wide roadway surface. The roadway surfacing consisted of two 2-inch courses for a total of 109,000 tons of mix. Two Galion Roll-O-Matic 8 to 12-ton tandem rollers compacted the mat behind the pavers. When the paving was complete, a seal coat of RC cutback asphalt and ⅜-inch chips was applied to the surface.

The supervisory staff for Alexander Construction Co. was headed by project manager Ralph Grimme. William Grimme was asphalt superintendent, and Harold Grimme was laydown foreman. Wally Nelson supervised the asphalt plant operations, and Clarence Lambrech was crusher foreman. Gordon Grohs was project engineer. Leon Felton was superintendent of the grading operations subbed by Haumont Contracting Co.

Build airport

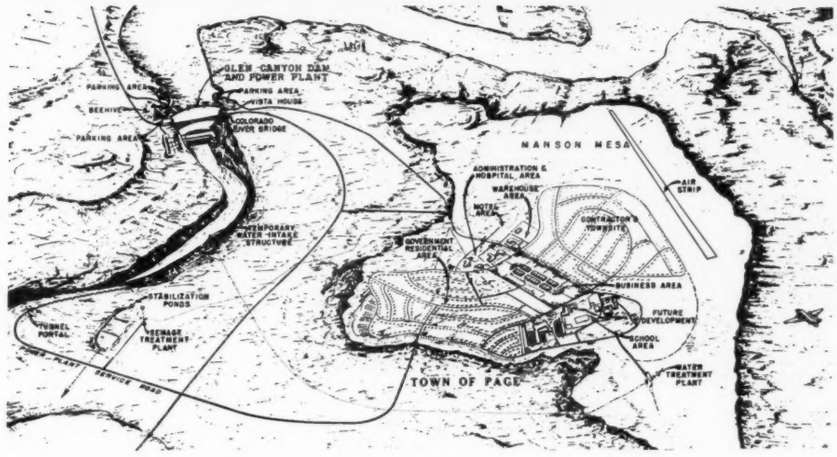
In areas as remote as the Glen Canyon Dam site, a reasonably good airport becomes a practical necessity. A temporary airstrip at Page served during the early construction stages, but was absorbed in the townsite area when a new airport was completed.

A part of Alexander Construction Co.'s $1,517,412 contract was for grading and paving of the new Manson Mesa Airport at Page. The project included the grading of an area 4,500 feet long and 500 feet wide, which has a 150-foot surfaced runway down the center; two 50×400-foot taxiways, and a 150×300-foot parking apron.

Haumont Contracting Co., Phoenix, Ariz., subcontracted the 114,000 cubic yards of earthwork. Using a Euclid S-18 and two LeTourneau-Westinghouse B Tournapulls, Haumont made quick work of the grading, finishing on September 20 after an August 1 start.

(Continued on next page)

For more facts, circle No. 224→



Sketch of job site.

You get depth-controlled, straight-forward precision grading — with the International Drott 4-In-1 *Skid-Shovel* action. Robert N. Orr uses this TD-9 4-In-1 to excavate and load 40, or more, cu. yd. per hour on a Tonawanda, N. Y., street-widening project! Use exclusive pry-over-shoe breakout to dig and load tough stuff!

Spreading and leveling fill on Firestone Company property near Buffalo, N. Y.—the operator uses 4-In-1 *bulldozer* action to do fast, close grading. Working depth is regulated by "radius control" of the earth-rolling blade. Contractor: E. R. Granada, Cheektowaga, N. Y.

Only 4-in-1 gives you four grading actions *in one machine!*

Get the grading action you need instantly—by merely moving the machine-selector lever on-the-go! Measure the performance protection of exclusive shock-swallowing Hydro-Spring. See what it means to get 4-machine utility for one-machine price! See your International Drott Distributor for a 4-In-1 demonstration!

Using a back-drag motion of the clam lip, with 4-In-1 *clamshell* action, this operator does a bank-shaping job he could do no other way—except by hand. The exclusive, big-capacity clamshell also gives "stand and fill" action—and self clean-out bottom dumping!

With inch-close grading accuracy this TD-9 4-In-1 puts new home landscaping on a production-line basis — using *"carry-type scraper"* action. You can also strip and spread with this easy-to-control grading and "earth boiling" ability that "single-action" loaders don't have!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

Water for the dry base course aggregate is supplied through a pipeline running from a pumping plant at the Colorado River. Water raised 856 feet to the top of the canyon wall is boosted another 250 feet in elevation to the plant's storage tank by these two Gorman-Rupp 6-inch pumps with Chrysler industrial engines.

(*Continued from preceding page*)

A Caterpillar D9 tractor push-loaded the scrapers in the cut and borrow areas. The D9 used a Cat ripper and dozer to good advantage in one cut where hard sandrock and caliche were encountered. The ripper was able to break up the material for easy loading by the scrapers.

In addition to the compaction supplied by the heavy scrapers, the grade was sheepsfooted by a Caterpillar D8 tractor pulling two pairs of LeTourneau-Westinghouse sheepsfoot rollers. Two Adams 660 motor graders did the finishing as the surface was given its final compaction by two 9-wheel rubber-tire rollers. One of these was a BMCO and the other a Rosco. They were sometimes pulled by a John Deere tractor, but when the going got tough in the loose sand they were pulled by one of the Adams motor graders.

Water supply vital

Water was again a problem since large volumes were needed for the very dry material. Two 4,000-gallon tanks on Autocar and Peterbilt diesel trucks carried the water from Alexander's storage tank and spread it on the runway. The sandy material was usually placed in lifts about 0.4 foot deep and then watered and sheepsfooted. The sheepsfoot rollers mixed and blended the water and sand while aiding compaction. As much as 238,000 gallons of water were applied in a single 10-hour shift. A number of times when the water supply ran too low, the entire grading operation had to be suspended.

The entire 500-foot-wide area was graded so as to have a finished cross slope of 1 per cent each way from the center. In order to allow for the base and surfacing, the runway, taxiway, and apron areas were graded 0.7 foot low. The same compaction was applied to the areas outside the runway as was given to the runway subgrade.

The 6 inches of crushed rock base and a single 3-inch hot-mix bituminous surfacing course were applied by Alexander, employing the same machines and techniques as were used on the highway paving.

In addition to the 188,000 tons of crushed-rock base materials produced by Alexander's crushing plants for the highway and airport, 460,000 tons of material were crushed and stockpiled for use as base and surfacing material on the Page city streets. Burt Cutler was chief inspector on both airport and road jobs for the USBR, and Willis Radcliff, construction inspector on the airport.

City streets, utilities

W. W. Clyde & Co. was the successful bidder for construction of the streets and underground utilities for Page townsite, and for the sewage treatment plant. Work on these contracts, which total more than $1.6 million, was started in August and will continue through the winter with completion scheduled for late next summer.

Clyde roughed out the street grades with a pair of Caterpillar D8 and 80 scraper combinations and an International TD-24 tractor-dozer. Later two Caterpillar DW21 scrapers, several more D8 tractors, and two Cat

100% INTERNATIONAL F
chosen to highball "T

To turn miles of prairie and millions of yards of Texas real estate into the Amarillo jet base takes a giant fleet of big-capacity, dirt-delivering equipment!

That's why the contractor, Terra Construction Co., of Great Bend, Kansas, chose International equipment 100% to high-ball this big base!

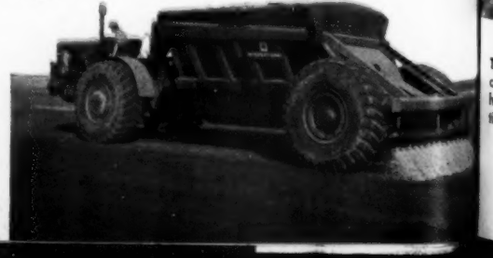
Texas hardpan boils into "75" Payscraper® bowls with cycle-clipping speed. Highly maneuverable TD-24 tandem pushers not only cut actual loading time, but rely on full-time, exclusive, Planet Power steering to reposition quickly to sharply reduce overall cycle time. And king-sized TD-24 power is instantly adjustable to the load with exclusive on-the-go Hi-Lo shifting!

Terra's International "75" Payscraper fleet makes fast loading count with fast get-away—and travel speeds up to 24 mph! High power-to-weight ratio, load-heaping bowl design, exclusive Hydro-Steer—all help give the Payscraper production-boosting operating ease and safety!

Investigate the advantages of powering-up with an all-International matched crawler-scraper fleet. See how International Payscrapers give you top speed, operating ease, and safety. Find out how International TD-24 Planet Power steering gives you pusher performance unmatched by conventionally-steered crawlers. See your International Construction Equipment Distributor for a demonstration!

Part of the Payscraper and TD-24 crawler fleet on the 100% International-equipped Amarillo air base job. Schedule calls for moving 25,000 cu. yd. per double-shift day—placed on the fill in 3-inch lifts.

To deliver the 40,000 gallons of water per hour—required to compact the dry soil to 95% of original density—the International Distributor came to the contractor's aid and specially modified Model "75" bottom-dump wagons into 5,400-gallon tanks.



INTERNATIONAL CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

No. 12 motor graders joined the spread.

The water distribution system and sewers were sublet to L. A. Creer Co., Provo, Utah, which moved in as soon as the grades were roughed out. Trenching was done by two backhoes and a Parsons trencher. A Tournadozer and a Pettibone Mulliken tractor-shovel handled the backfill operations.

To supply his own crews with concrete for sidewalks, curbs, and gutters and the sewage treatment plant, Clyde set up a Noble concrete batching plant on a hillside near the townsite. The concrete is being mixed and delivered by three Smith 5½-yard transit mixers on Ford and International trucks. This setup is also supplying concrete to other contractors working at the townsite.

Clyde also installed a water supply system to raise water 1,200 feet to a storage tank. A pump, equipped with a porcelain liner to resist the abrasive suspended matter, drafts from the river to a steel settling tank on the bank. A Cornell high-pressure pump powered by a GM 4-71 diesel engine raises the water from the settling tank to the storage tank at the townsite.

With the street grades already work.

A number of other contracts have been awarded at Page and work is starting on all of them. Pittsburgh-Des Moines Steel Co. is building a water reservoir and elevated storage tank. Southern Engineering & Construction Co., Long Beach, Calif., has the contract for developing the water supply system. A group of portable Transa-Homes have been erected and are being used by Bureau of Reclamation field personnel.

One of the most recent awards for the townsite is the contract for the construction of 200 permanent homes. This award in the amount of $2,723,500 was to Page City Construction Co. of Bakersfield, Calif.

With the large number of construction workers already living on the site, it was necessary to provide a school this year. A temporary warehouse building, converted into a school, serves more than 100 students. The permanent school building will be constructed in time for classes by the opening of the fall term.

THE END

WER SHIFT TRANSMISSION

VES YOU ALL 3

4 SPEEDS FORWARD, 4 REVERSE

INTEGRAL DESIGN

FLEET....

"Texas-Sized" jet base!

Tandem TD - 24 pushers profitably overcome the obstacle of loading heat-hardened hard-pan by reducing loading time by 44.4%!

Terra gets an 11.3% production advantage with profit-wise TD-24 tandem push-loading.

	Single TD-24 pusher	Tandem TD-24 pushers
Av. Loading Time:	1 min. 43 sec.	57 sec.
Trips per 60 min. hr.	8.78	9.89
Av. Payload	17.3 cu. yd.	17.3 cu. yd.

←For more facts, circle No. 225

Colorado Fuel & Iron Co. appoints sales managers

Earnest J. Bolduc and Charles P. Harlow have been appointed district sales manager and sales manager of the hardware products department, respectively, of the Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., New York, N. Y. From headquarters in Boston, Mass., Bolduc will be in charge of the New England territory.

Harlow, former assistant sales manager of the New England area for the firm, will assume his new duties at the corporation's subsidiary, American Wire Fabric Corp., Mt. Wolf, Pa.

Bucyrus-Erie appoints

Harry Thorton has been promoted to assistant Eastern sales manager of the Bucyrus-Erie Co., South Milwaukee, Wis. He will assist F. Leslie Jones, Eastern sales manager, and continue to work out of the New York office.

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In addition to the 188,000 tons of crushed-rock base materials produced by Alexander's crushing plants for the highway and airport, 460,000 tons of material were crushed and stockpiled for use as base and surfacing material on the Page city streets. Burt Cutler was chief inspector on both airport and road jobs for the USBR, and Willis Radcliff, construction inspector on the airport.

City streets, utilities

W. W. Clyde & Co. was the successful bidder for construction of the streets and underground utilities for Page townsite, and for the sewage treatment plant. Work on these contracts, which total more than $1.6 million, was started in August and will continue through the winter with completion scheduled for late next summer.

Clyde roughed out the street grades with a pair of Caterpillar D8 and 80 scraper combinations and an International TD-24 tractor-dozer. Later two Caterpillar DW21 scrapers, several more D8 tractors, and two Cat

100% INTERNATIONAL

chosen to highball "T

To turn miles of prairie and millions of yards of Texas real estate into the Amarillo jet base takes a giant fleet of big-capacity, dirt-delivering equipment!

That's why the contractor, Terra Construction Co., of Great Bend, Kansas, chose International equipment 100% to high-ball this big base!

Texas hardpan boils into "75" Payscraper® bowls with cycle-clipping speed. Highly maneuverable TD-24 tandem pushers not only cut actual loading time, but rely on full-time, exclusive, Planet Power steering to reposition quickly to sharply reduce overall cycle time. And king-sized TD-24 power is instantly adjustable to the load with exclusive on-the-go Hi-Lo shifting!

Terra's International "75" Payscraper fleet makes fast loading count with fast get-away—and travel speeds up to 24 mph! High power-to-weight ratio, load-heaping bowl design, exclusive Hydro-Steer—all help give the Payscraper production-boosting operating ease and safety!

Investigate the advantages of powering-up with an all-International matched crawler-scraper fleet. See how International Payscrapers give you top speed, operating ease, and safety. Find out how International TD-24 Planet Power steering gives you pusher performance unmatched by conventionally-steered crawlers. See your International Construction Equipment Distributor for a demonstration!

Part of the Payscraper and TD-24 crawler fleet on the 100% International-equipped Amarillo air base job. Schedule calls for moving 25,000 cu. yd. per double-shift day—placed on the fill in 3-inch lifts.

To deliver the 40,000 gallons of water per hour—required to compact the dry soil to 95% of original density—the International Distributor came to the contractor's aid and specially modified Model "75" bottom-dump wagons into 5,400-gallon tanks.

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

No. 12 motor graders joined the spread.

The water distribution system and sewers were sublet to L. A. Creer Co., Provo, Utah, which moved in as soon as the grades were roughed out. Trenching was done by two backhoes and a Parsons trencher. A Tournadozer and a Pettibone Mulliken tractor-shovel handled the backfill operations.

To supply his own crews with concrete for sidewalks, curbs, and gutters and the sewage treatment plant, Clyde set up a Noble concrete batching plant on a hillside near the townsite. The concrete is being mixed and delivered by three Smith 5½-yard transit mixers on Ford and International trucks. This setup is also supplying concrete to other contractors working at the townsite.

Clyde also installed a water supply system to raise water 1,200 feet to a storage tank. A pump, equipped with a porcelain liner to resist the abrasive suspended matter, drafts from the river to a steel settling tank on the bank. A Cornell high-pressure pump powered by a GM 4-71 diesel engine raises the water from the settling tank to the storage tank at the townsite.

With the street grades already work.

A number of other contracts have been awarded at Page and work is starting on all of them. Pittsburgh-Des Moines Steel Co. is building a water reservoir and elevated storage tank. Southern Engineering & Construction Co., Long Beach, Calif., has the contract for developing the water supply system. A group of portable Transa-Homes have been erected and are being used by Bureau of Reclamation field personnel.

One of the most recent awards for the townsite is the contract for the construction of 200 permanent homes. This award in the amount of $2,723,500 was to Page City Construction Co. of Bakersfield, Calif.

With the large number of construction workers already living on the site, it was necessary to provide a school this year. A temporary warehouse building, converted into a school, serves more than 100 students. The permanent school building will be constructed in time for classes by the opening of the fall term.

THE END

Colorado Fuel & Iron Co. appoints sales managers

Earnest J. Bolduc and Charles P. Harlow have been appointed district sales manager and sales manager of the hardware products department, respectively, of the Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., New York, N. Y. From headquarters in Boston, Mass., Bolduc will be in charge of the New England territory.

Harlow, former assistant sales manager of the New England area for the firm, will assume his new duties at the corporation's subsidiary, American Wire Fabric Corp., Mt. Wolf, Pa.

Bucyrus-Erie appoints

Harry Thorton has been promoted to assistant Eastern sales manager of the Bucyrus-Erie Co., South Milwaukee, Wis. He will assist F. Leslie Jones, Eastern sales manager, and continue to work out of the New York office.

←For more facts, circle No. 225

FLEET....

"Texas-Sized" jet base!

Tandem TD-24 pushers profitably overcome the obstacle of loading heat-hardened hard-pan by reducing loading time by 44.4%!

Terra gets an 11.3% production advantage with profit-wise TD-24 tandem push-loading.

	Single TD-24 pusher	Tandem TD-24 pushers
Av. Loading Time:	1 min. 43 sec.	57 sec.
Trips per 60 min. hr.	8.78	9.89
Av. Payload	17.3 cu. yd.	17.3 cu. yd.

Book outlines good construction practices

"Practices and Methods of Construction", by Joseph Steinberg and Martin Stempel, is a textbook designed to acquaint students with the procedures necessary to carry through a construction job from basic idea to completion. Subjects treated include selection of the site, availability of services, grading and subsurface exploration to determine the need for special types of foundations, and construction in accordance with plans and specifications and local building codes.

Part I, entitled "Construction Superintendent Procedures and Practices", covers in detail such topics as construction insurance and job schedules. Part II, " Construction Methods, Materials, and Equipment", takes up excavation, concrete work, steel work, pile-driving, cofferdams, caissons, wellpointing, and other operations. The material, presented in graphic, non-technical language, presents the most economical, up-to-date methods used in industry today. Intended as a guide book rather than a rule book, since individual contractors, superintendents and builders often have special approaches which they have found time and money-saving, the text simply outlines methods of good construction used by various reputable firms. Many drawings, pictures, charts, graphs, and tables illustrate the text.

Priced at $6, the book may be obtained from the publishers, Prentice-Hall, Inc., Englewood Cliffs, N. J.

Research points way to cut cost of inspecting welds

A research project recently completed in the Department of Welding Engineering at Ohio State University, Columbus, Ohio, shows that the high cost of weld inspection can be eliminated. The cost of testing and inspecting welds, often required by code to be done with elaborate equipment, frequently equals or may even exceed, the cost of making the welds.

A series of tensile, bend, and impact tests were made on butt welds in ½-inch-thick mild steel. The welds were made under controlled conditions with automatic submerged-arc and inert-gas processes so as to create porosity in welds.

Tests showed that the welds could contain porosity, amounting in total volume to a void equal to 7 per cent of the cross section of the weld, without a material change in tensile or impact strength and ductility. The tests were all made on welds machined flat from the ½-inch thickness of the plate.

A small amount of porosity is generally accepted by current inspection standards. But the results of the Ohio State University tests show that up to 7 per cent reduction of the cross section has little or no effect on weld strength.

Gardner-Denver film shows construction of Gross Dam

A 16 mm, 33-minute color film, "A Cup for Adam's Ale", has been released by the Gardner-Denver Co., Quincy, Ill. The picture shows the construction of the Gross Dam in the Colorado mountains and stresses the economics of dam building and water conservation. It covers the more than three years the dam was under construction.

The film is available for showing to schools, clubs, and other interested groups, without charge, from the Film Library, Gardner-Denver Co., Quincy, Ill.

ENDS MESS AND WASTE

NEW SINCLAIR LITHOLINE MULTI-PURPOSE GREASE CARTRIDGE

EASIER, FASTER, CLEANER LUBRICATION FOR CONTRACTORS

There's no mess, no spilling, no waste in filling your grease guns—when you use the new Sinclair LITHOLINE Multi-Purpose Grease Cartridge. Takes only seconds to pop a cartridge into the gun—and you're ready to lubricate. Fits all regular cartridge type guns.

Use Sinclair LITHOLINE for grease fittings on your equipment. It provides full protection against wear, rust, water—"stays put" under all conditions.

A Sinclair Lubrication Engineer will be glad to show you how the new Sinclair LITHOLINE Multi-Purpose Grease Cartridge can help *you*. Call your nearest Sinclair Representative, or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR LITHOLINE®

MULTI-PURPOSE GREASE CARTRIDGE

For more facts, use Request Card at page 18 and circle No. 226

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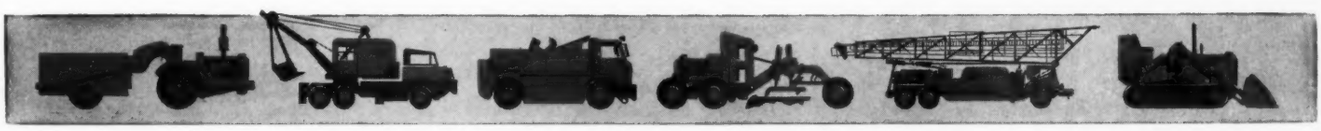
1 4 SPEEDS FORWARD, 4 REVERSE

2 COMPACT, INTEGRAL DESIGN

3 500 FT-LBS TORQUE CAPACITY



The new power shift transmission by Westinghouse is designed for use on engine-driven equipment used off the highway where multi-speed operation is required.

Consisting of a torque converter and a power transmission compactly designed in an integral housing, the Westinghouse power shift transmission combines in one package the desirable features of the hydraulic torque converter, fluid coupling and power shift transmission. The entire unit is less bulky, takes less space . . . can be less expensively installed and maintained.

With four speeds forward and reverse, the Westinghouse power shift transmission is ideally suited for vehicles which must travel in both directions during a normal work cycle. Using the simple, rugged counter-shaft principle with constant-mesh gears, field maintenance is reduced to a minimum. The transmission has two ranges, with each range having two speeds, both forward and reverse. (A high range for high vehicle speeds at moderate loads and a low range for low vehicle speeds at heavy loads.)

Simple to operate, a flip of the operator's lever accomplishes power shifts within each range, including forward and reverse . . . and without any interruption of power flow through the transmission and drive.

Automatic feature of the converter and ease of power shifting simplifies operator training and substantially contributes to longer operating life of the equipment. Absence of clutch pedal assures smooth, maximum traction acceleration.

Rated at 500 ft-lbs maximum input torque, the Westinghouse power shift transmission can be used with a wide range of internal combustion engines . . . including the Continental PE-200-1; Cummins HRBB-600, JT-6, JBS-600; General Motors 4-71, 3-71; Hall-Scott 590; Waukesha 140-GZB, 145-GKB, and many others.

J-07363

CHECK THESE SPECIFICATIONS:

GEAR RATIOS	
LOW RANGE	**FORWARD AND REVERSE**
1st gear	6.85
2nd gear	3.43
HIGH RANGE	
3rd gear	2.14
4th gear	1.07

OPTIONAL EQUIPMENT: Direct connection to engine flywheel; convertor tail shaft governor drive; speedometer drive; parking brake.

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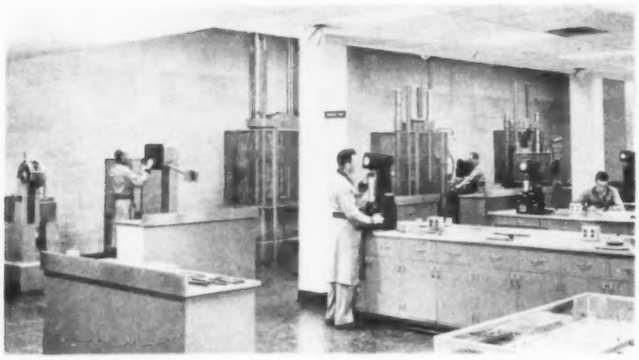


Ferrous and nonferrous metals are tested in the physical testing area of Caterpillar's Production Metallurgical and Materials Testing Laboratory at the Peoria, Ill., plant.

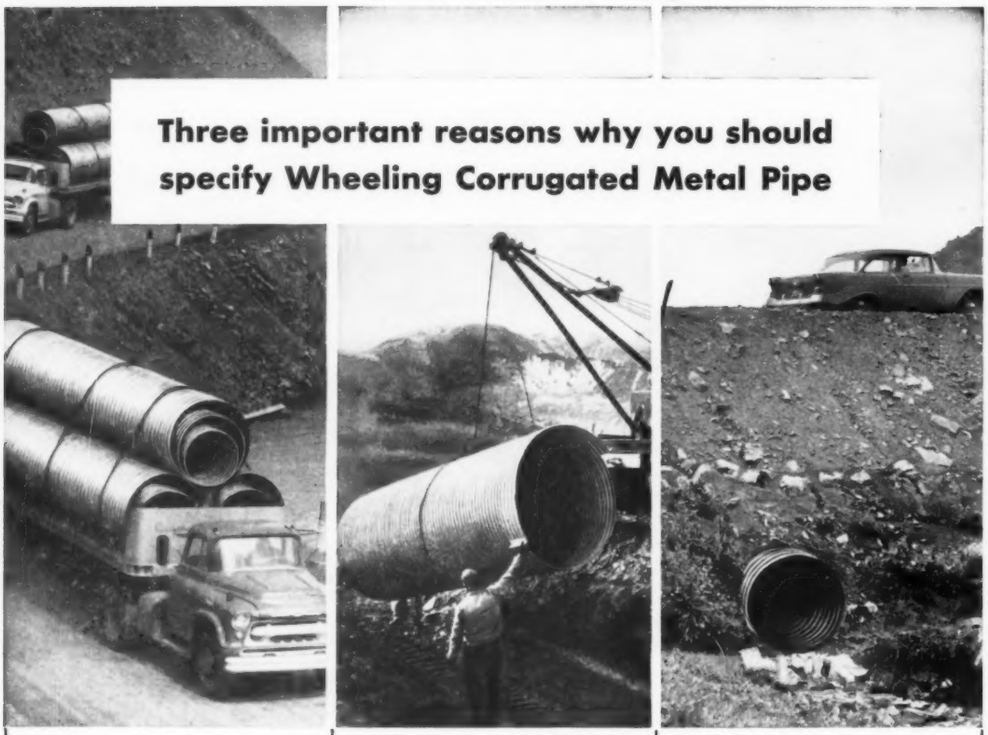
Caterpillar laboratory has dual function

In testing and improving a simple track bolt, and in developing a boron-treated steel now used in tractor sprockets, the new Production Metallurgical and Materials Testing Laboratory at Caterpillar Tractor Co., Peoria, Ill., fulfills its dual role of insuring the rigid control of all materials used in the manufacture of company machines, and fostering the development of new processes.

The laboratory, occupying 22,000 square feet of space and completely functional in design, contains a number of specialized laboratories. All new products coming from suppliers are tested in one or more of these areas. In the physical testing laboratory, all ferrous and nonferrous metals are tested for hardness, ability to withstand impact, tensile strength, and other required qualities. A photographic section is equipped to do both color and black-and-white processing; photomicrographs—magnified photographs of surfaces and cross sections of metals—are made as permanent records.

The spectroscopy laboratory makes chemical evaluations of steel by applying an electric arc to a metal sample to produce a white light; a spectrometer prism breaks down this light into the colors of the spectrum, permitting an accurate analysis of elements present; a spectrograph records the elements photographically; and a quantometer records them on graph paper. A weld-testing laboratory uses ultrasonic testing to establish weld soundness. In the paint laboratory a Weatherometer simulates in 1,000 hours conditions requiring years under natural circumstances. A chemistry laboratory tests all materials not submitted to spectroscopic analysis. A special rubber laboratory tests all production of rubber products.

A staff of metallurgical, chemical, and welding engineers evaluates the new materials, establishes testing techniques, prescribes specifications, helps solve manufacturing problems, and develops new applications.



Three important reasons why you should specify Wheeling Corrugated Metal Pipe

SAVE TIME

Lightweight Wheeling Metal Culvert Pipe is rushed to the job-site from Wheeling warehouses or Culvert Shops. Nestability cuts transportation and construction time.

SAVE MONEY

Fast installation of the long, light sections of Wheeling Metal Culvert Pipe is accomplished with ordinary labor and equipment. Men work faster, keep costs down.

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Flexible Wheeling Culverts often last longer than the road they are under. They give years of trouble-free service—stand up under weather, traffic, and shifting soil.

Wheeling Culverts are helping designers get full value from each tax dollar in the nation's new program of highway building.

Wheeling Culvert Pipe or Pipe Arch, in Copper Steel or Copper-bearing Pure Iron, plain galvanized or bituminous coated (with or without paved invert) comes in a wide range of gauges and diameters.

For complete details write, wire or call the Wheeling warehouse, Culvert Shop or sales office nearest you.

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18 Wheeling Warehouses, Culvert Shops and Sales Offices: Atlanta, Boston, Buffalo, Chicago, Columbus, Des Moines, Detroit, Houston, Kansas City, Louisville, Madison, Minneapolis, New Orleans, New York, Peoria, Philadelphia, Richmond, St. Louis.

For more facts, use Request Card at page 18 and circle No. 228

HRB bulletin discusses highway needs for 1957

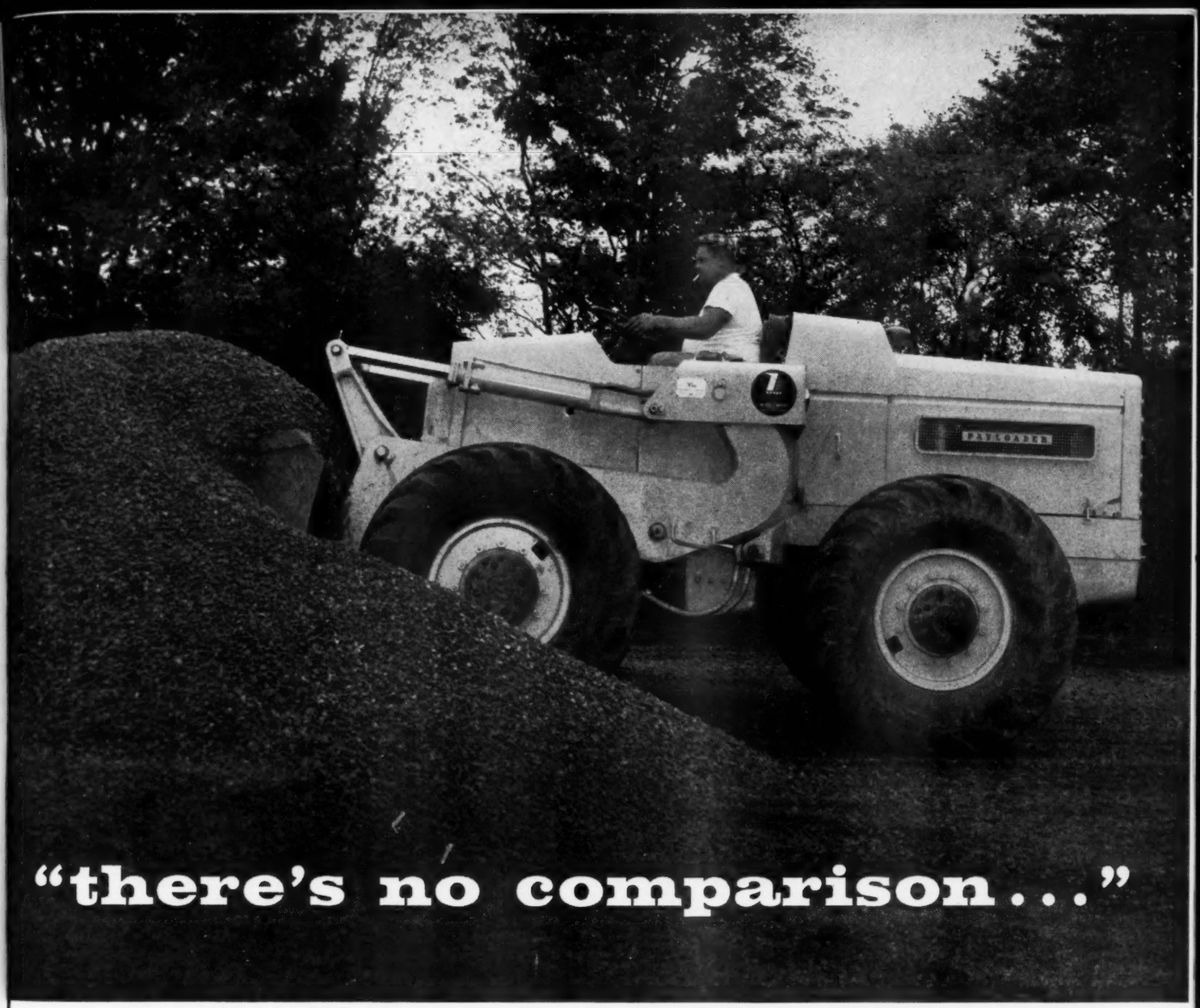
Bulletin 158, "Highway Needs Studies 1957", is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. Some of the topics covered in the bulletin are on traffic accident records, predicting traffic accidents from roadway elements, factors influencing rural road mileage, and estimating maintenance needs.

Other topics deal with priorities determination and programming in Tennessee, effect of traffic growth projections upon estimates of highway needs and revenue, evaluating contract costs in highway needs studies, and highway program evaluations.

The $2.80 bulletin may be purchased from the Highway Research Board.

American Bosch Arma buys Hydramotive, Inc.

American Bosch Arma Corp., Springfield, Mass., has purchased Hydramotive, Inc., Cleveland, Ohio. Hydramotive has developed a hydraulic starter known as the Hydrotor for all types of diesel and gasoline engines. The American Bosch Division of American Bosch Arma produces diesel fuel injection systems.



"there's no comparison..."

"Our model HH 'PAYLOADER' handles an average of 100 tons per hour working a 50 foot radius loading the bins at our asphalt plant," says C. A. Pratt, plant manager of Osborne, Inc., Mentor, Ohio, who also use it on highway construction. "It has our larger, heavier loader beat in all these features — ease of operation, operator safety and work-ability. There's no comparison."

G. C. Balish, the operator, says "it's built for maximum production. The roll-back bucket action is the best of any loader I've ever operated — gets a full payload every time and keeps a full load during delivery . . has maximum operator safety and operating ease. I prefer the HH any day."

Your Hough Distributor is ready to show you *all* the superior features of the model HH and the other two 4-wheel-drive "PAYLOADER" sizes. A demonstration will convince you that they are the finest, most productive units, size for size, in tractor-shovel history. The Frank G. Hough Co., 762 Sunnyside Ave., Libertyville, Ill.

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THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
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Now your Hough Distributor has at his disposal the broadest and most complete set of financing plans ever offered: — TIME PAYMENT . . . LEASING PLANS*, with or without OPTION TO PURCHASE — any and all kinds of financing to best fit your needs for the purchase of "PAYLOADER" equipment. See him today.

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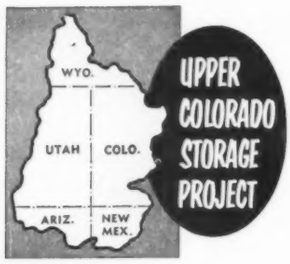
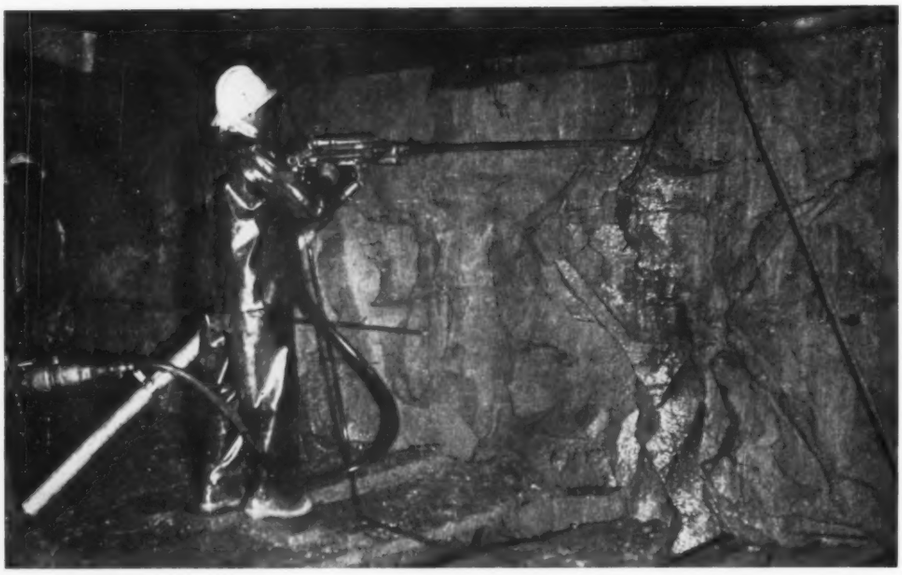


Long bolts support roof of right diversion tunnel at Glen Canyon Dam site

Excavation starts on left diversion and powerhouse access tunnels; cableway and "monkey slide" take men, rigs into 800-foot-deep canyon



In the right diversion tunnel, a workman on the jumbo uses a Cleveland H10 AL drill with an AL92 leg to sink a 1⅞-inch hole in sandstone. Waterproof clothing sheds the spray as water at 100 psi pressure removes the cuttings.

As excavation progresses, crews drive 1-inch-round and 6 to 8-foot-long bolts into separate bedding planes of the roof to prevent a fall-in. The Gardner-Denver R94 stoper drills holes, places bolts, and tightens nuts. One end of the bolt has an expansion anchor; the other has a steel plate held on by a 1-inch hex nut.

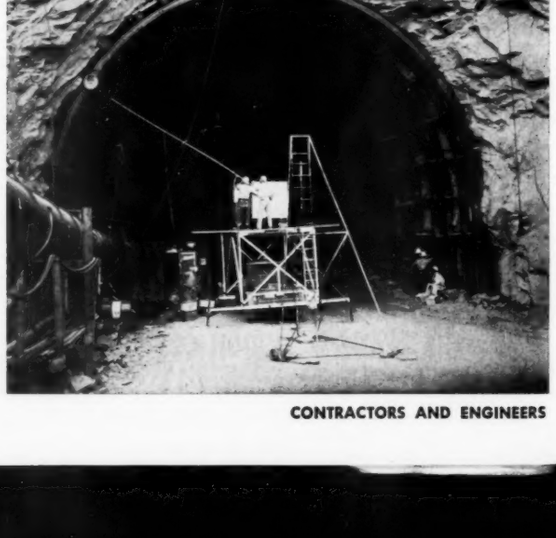
Burrowing into the Navajo sandstone walls of Glen Canyon like a colony of berserk prairie dogs, a group of contractors are blasting out a series of tunnels to divert the Colorado River around the Glen Canyon Dam site and provide access to the bottom of the canyon for vehicles. The right bank diversion tunnel has been holed through and made ready for lining; the others have been started and work on them will continue until well into next year.

One major difference between these tunnels and the more common prairie dog holes lies in the method used to support the roofs against a fall-in. Instead of the more conventional steel-arch ribs and wood lagging, long bolts, anchored 6 to 8 feet into the undisturbed rock, are being used to support the sandstone roofs.

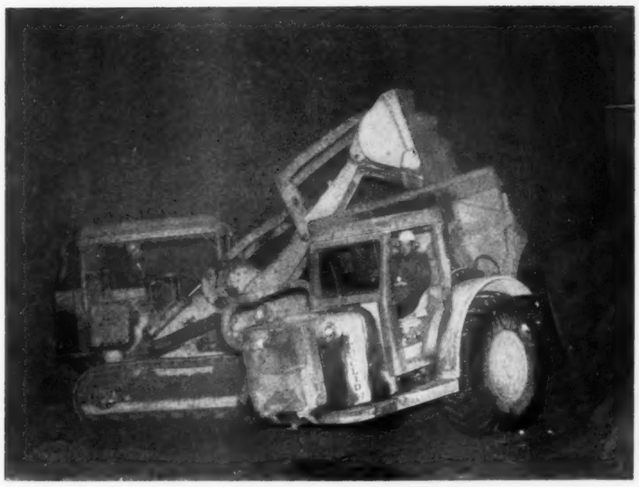
Tunneling is probably the most important of the early construction activities at Glen Canyon Dam, the key unit in the U. S. Bureau of Reclamation's huge Upper Colorado Storage Project. Before any work can be done in the river bed at the dam site, the diversion tunnels must be completed. And before there is access from the top to the bottom of the canyon—other than by cableway or derrick—a 2-mile-long access tunnel must be driven.

Excavation of the right diversion tunnel, the lowest and longest of the two diversion tunnels, is being done by Mountain States Construction Co., Denver, Colo. This is a separate USBR contract in advance of the big

At the upstream portal, USBR inspectors cross-section the arch from a specially developed jumbo. This jeep-mounted jumbo has a target centered over a piano wire stretched along the center line of the tunnel.



Euclid 12-yard rear-dumps start the mucking operation in the early evening. Muck is dumped upstream from the tunnel to build a road leading to Wahweap Creek Canyon, where a road leads to the rim.



In the excavation of the right diversion tunnel, mucking is handled by a Caterpillar 977 Traxcavator, which loads out to a Euclid S-7 end-dump. The tunnel is big enough for the "Eucs" to pass each other on the way to and from the heading.

prime contract for the dam. The lining of this tunnel is included in the prime dam contract, held by Merritt-Chapman & Scott Corp., New York City.

Several other tunnels are also included in the M-C&S contract. One of these is the left-bank diversion tunnel. Another is a 2-mile-long powerhouse access tunnel which will provide a roadway from the top of the canyon wall to the powerhouse site at the bottom. Also, a spillway tunnel must be driven on each bank from the spillway intake channels down into the diversion tunnels. The upstream ends of the diversion tunnels will later be plugged to convert them into permanent spillway tunnels.

These tunnels in the M-C&S contract are being driven by a subcontractor, Frazier-Davis Construction Co., St. Louis, Mo., which in turn sublet half of the powerhouse access tunnel to Gibson & Roberts, Yardley, Wash.

Right diversion tunnel

Mountain States Construction Co. set the pattern when they sublet the excavation of the right diversion tunnel to two subcontractors. The drilling, shooting, and supporting of the tunnel were done by Northwood, Inc., Vancouver, B. C. The mucking was sublet to Theo Wood Construction Co., Salt Lake City, Utah.

When work was started on this first tunnel in December, 1956, the first problem was to get men and equipment down to the bottom of the 800-foot-deep vertical-walled canyon. To do this, the contractor built a cableway spanning the canyon over the location of the downstream portal. This cableway had a timber tower on each bank with a 3½-inch gut-cable strung between the towers and anchored securely into the rock at both ends.

One of the first, and heaviest, lifts made on this cableway was a Caterpillar D8 tractor. Other heavy loads included two Gardner-Denver 900-cfm compressors and four Euclid S-7 rear-dumps. The cableway picked the machines up at the top of the canyon, swung them out over the gorge, and lowered them to the narrow bench beside the muddy Colorado at the bottom.

Later an inclined "monkey slide" was built near the upstream portal for raising and lowering the men, supplies, and lighter pieces of equip-

(*Continued on next page*)

"Our 75-ton *Southwest* Pneumatic Compaction Roller averages 10,000 cu. yds. of fill compaction per day," reports

OBERG CONSTRUCTION CO.
Inglewood, California

The $7.2 million Ventura-San Diego Freeway interchange in California is a big earthmoving job in any league. It's a two year project—scheduled for completion in 1959 — involving 4.3 miles of road construction where the two freeways intersect near Van Nuys, California. In addition to roadways, the project includes 10 concrete bridges, an equestrian underpass, and a pedestrian overpass. Some 2.5 million yards of earth fill will have been compacted when the job is completed —and that's a lot of compaction on any highway job.

Compaction problems on the Ventura-San Diego Freeway job aren't easy. 1.1 million yards of the material compacted comes from the balanced cut and fill on the job site and a borrow pit in the Sepulveda Dam basin, and the remaining 1.4 million yards is obtained from a borrow pit miles from the project site and trucked in. That means a variety of types of material, varying moisture content, and a wide disparity in soil structure.

To Oberg Construction Co., prime contractors on the job, these compaction problems are not new. The firm knows compaction methods and compaction equipment. The contractors selected a Southwest 75-ton Pneumatic Multiple-Box Compaction Roller as the basic compaction tool for the work. To lend support, three Southwest Sheepsfoot Double-Drum Tamping Rollers were added to complete the compaction machinery spread. The multiple-box pneumatic compaction roller is pulled by an integrally attached Caterpillar DW21 single axle Tractor, and the sheepsfoot tampers by Caterpillar D8 Track-Type Tractors.

While the Southwest 75-ton Multiple-Box Pneumatic Roller is utilized mainly for compaction of long fills, it also works on area compaction near bridge approaches on the job. Oberg Construction Co. personnel describe the operation in their own words as follows: "We purchased the Southwest 75-ton Pneumatic Roller and Cat DW21 Tractor combination because it is fast, agile and efficient. We are taking full advantage of these features to step up our production. Working with only one of our Southwest Sheepsfoot Tampers, the 75-ton pneumatic roller is averaging 10,000 cubic yards of fill compaction per day — easily handling to 90% compaction specification all the material delivered by a fleet of eight Cat DW21 Tractor-Scrapers. On the longer fills we find that the Southwest Pneumatic compacts higher fills in fewer passes. To take full advantage of the pneumatic's speed and efficiency we disc, roll and sprinkle the long fills, facilitating rapid compaction by the hefty Southwest tool," they conclude.

Southwest Heavy Duty, Multiple-Box Type Pneumatic Compaction Rollers range in size from 10 to 100 tons. Turning radii, with single-axle tractor, range from only 8'9" to 15'. The tractor and compactor deliver constant load pressure regardless of contour—due to the extra-oscillating freedom of the Southwest individually mounted wheels and weight boxes. A full 12" of vertical oscillation of the weight boxes and wheels is possible in all models, eliminating load bridging or shifting, and assuring constant compaction weight on each wheel. Compaction of lifts up to 24" are possible with Southwest Pneumatic Multiple-Box Compaction Rollers—higher lifts in fewer passes.

COMPACTION IS BEST WHEN YOU USE SOUTHWEST

Call or Write for information.

Pneumatic Compaction Rollers • Sheepsfoot Rollers • Rippers • Sprinkler Tanks

Southwest PRODUCTS ARE SOLD AND SERVICED BY YOUR CATERPILLAR® DEALER

CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.
ALHAMBRA, CALIFORNIA

For more facts, use Request Card at page 18 and circle No. 230

At the upper portal of the powerhouse access tunnel, an Eimco loader cleans up while crews anchor woven-wire fencing to the rock with roof-support bolts, following a fall-in.

(*Continued from preceding page*)

ment. The "monkey slide" is a cage which holds six men, or 1,000 pounds, and travels on a pair of 9/16-inch non-spin cables. The cables, anchored into the rock at the bottom, rise at an angle of 67 degrees to pass over a low tower at the rim of the canyon and thence to solid anchorage in the rock.

A Joy mine hoist powered by a Caterpillar 40-hp engine raises the cage at a speed of 350 fpm; the upward trip is made in just over two minutes. It never takes the cage a full minute to make the descent.

Build roads in canyon

When the D8 tractor-dozer was lowered into the canyon, its first job was to rough out a road some 2,800 feet along the bank of the river, from the downstream portal to the upstream portal. All of the mining equipment traveled over this road to the upstream portal where the tunnel was begun. The road was later widened and improved with the broken sandstone mucked out of the tunnel.

As the portal excavation was being carried down through the accumulation of rock that had fallen from the canyon walls or had been pushed up by the river, the face of the solid Navajo sandstone was exposed and trimmed for the start of tunneling. By February 13, 1957, the portal had been cleaned up and all was in readiness for the start of the tunnel excavation.

This tunnel was excavated to a diameter of 43.5 feet at its upstream end, growing to 46.5 feet toward the downstream portal. It will later be lined with concrete to diameters of approximately 40 and 43 feet. The bore enters the canyon wall at a fairly sharp angle and then swings in a flat U alignment to daylight below the dam site, 2,746 feet from the upstream portal. Approximately six feet of muck was left in the bottom of the tunnel to provide a good road during the mining operation. This was then excavated to grade by the mucking contractor.

Bolts support roof

In the first few feet of tunnel, Northwood installed conventional steel-beam arch supports, backed by wood lagging, to support the roof of the tunnel. The remainder of the tunnel was driven without timbering; a vast number of roof bolts was used to prevent the fall-in of pieces of rock from the roof. These bolts in 6 and 8-foot lengths were set from the top deck of the jumbo each day while the face was being drilled. Workmen used a Gardner-Denver R94 stoper to drill the holes, place the bolts, and tighten up the nuts.

One end of the high-tensile bolts was fitted with a wedge and slot-type anchor. The other end of the 1-inch bolts was threaded. In placing the bolts, crews first drilled a hole to the proper depth to reach one of the two separate bedding planes used for anchorage. The bolt was then inserted in the hole and rammed home to expand the anchorage device. An 8×⅜-inch steel plate washer was slipped over the threaded end and the 1-inch hex nut was applied. The stoper was then used to tighten the nut, which drew the plate up tight against the face of the rock roof.

Each of these 1-inch roof-support bolts will support a load of 37,000 pounds, and the contractor used enough of them for adequate protection against any serious fall-ins. About three quarters of the bolts were

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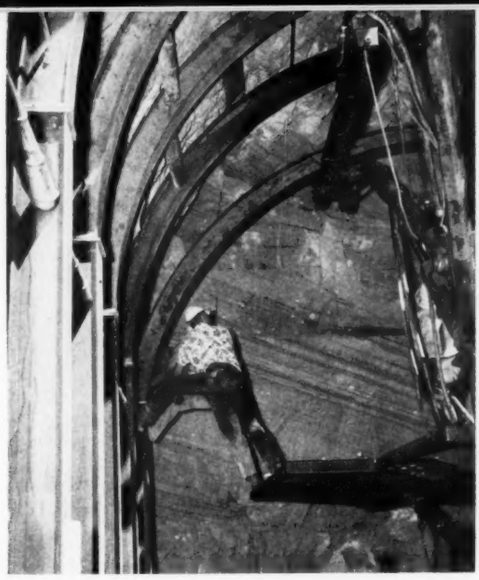
Drilling at the upper half of the powerhouse access tunnel is done with this "Euc"-mounted drill, which carries six Gardner-Denver hydraulic booms on three levels.



In the lower half of the tunnel, Frazier-Davis crews assemble the steel support ribs. The horseshoe-shaped tunnel, 23 feet high and 20 feet wide, will run down to the powerhouse on a continuous grade of about 8 per cent.

of the 6-foot length, one quarter were 8 feet long.

Use big jumbo

Northwood, Inc., used a single big jumbo for drilling and loading the heading. The five-deck jumbo was carried on four big 14:00×20, 26-ply nylon tires. The two front wheels were placed in caster mountings which permitted them to swivel for steering the jumbo. The Caterpillar D8 tractor moved it into position for each day's drilling and pulled it back out to the shooting position after the round was loaded.

Using 20 Cleveland H10 AL drills with AL92 legs all operating from the jumbo at the same time, workmen drilled the 16-foot round of approximately 200 holes 1⅞ inches in diameter. After trying several types of bits, Northwood settled on Cleveland CRD single-use bits with tapered sockets. While the sandstone was very abrasive, it was moderately soft. The drills penetrated the sandstone with the 8-foot length of steel in about 2½ minutes, and steels were changed at that point to reach the full 16-foot depth of the round.

Air for the drilling was provided by a pair of Gardner-Denver 900-cfm rotary compressors located at the upstream portal. The two big compressors pumped into a receiving tank, from which a pipeline carried air to the heading.

Water removes cuttings

An ingenious arrangement of water pumps served a dual purpose. Seepage in the tunnel was picked up by two air-powered Ingersoll - Rand pumps and delivered to a deep sump near the upstream portal. This was clear, clean water, free of the heavy load of silt carried by the river water. A Goulds high-pressure pump, set in the sump, pumped this clear water at 100 psi to the jumbo at a heading. Here it was used in the drills to wash out the cuttings.

At the same time that the water was being used to wash out the cuttings, the water level in the sump was being lowered, so that a satisfactory water level was maintained in the tunnel. When water was not being used at the heading, a by-pass valve permitted the water to discharge into the river.

Ventilation of the tunnel was provided by a 42-inch steel pipeline con-

(*Continued on next page*)

DIG . . . TRAVEL *Anywhere* with a fast, mobile LORAIN SP-107

DRAGLINE—Here a Lorain SP-107 with a ⅜-yd. dragline bucket mucks out channel bottom ½ mile from road.

Here's a new contractors' excavating tool with rubber-tire travel speed to get it where it's wanted—fast . . . yet, with the tractive effort, flotation and power usually associated only with crawler machines.

Whether for "handy-andy" use on big construction projects . . . or as the prime excavator on a residential basement, the agile, high-speed, ⅜-yd. Lorain SP-107 is designed to be a profit-making contractors' tool.

Take it where the jobs are, over city streets, highways or cross-country where the going can be rough. Move it in and go to work and see what this "powerhouse" can do for you. Here are some additional features of the "107" you'll want to know about:

- Torque converter power take-off gives it lots of hang on . . . won't give up on the tough jobs.
- With 3 or 6 travel speeds — up to 15 m.p.h. — the Lorain SP-107 is fast from job to job . . . fast around the job.
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- No outriggers needed . . . no fuss, no bother, no lost time . . . move in and go to work.
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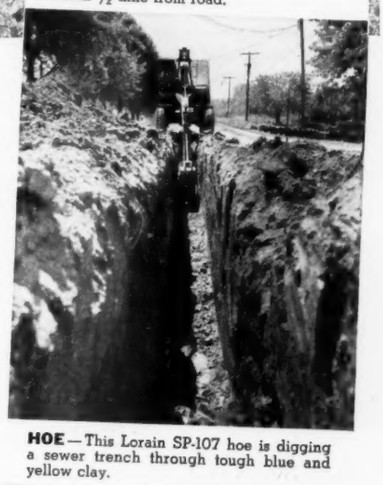
Your Thew-Lorain Distributor can show you how the Lorain SP-107 can be quickly converted for any kind of contractor's use. See him for details soon.

THE THEW SHOVEL CO., LORAIN, OHIO



HOE—This Lorain SP-107 hoe is digging a sewer trench through tough blue and yellow clay.

SHOVEL—The Lorain SP-107 is easily converted to a ⅜-yd. shovel.

THEW LORAIN

For more facts, use Request Card at page 18 and circle No. 232

One of the Euclid S-7 rear-dumps unloads sandstone along the river in the canyon, building up a road along the bank.

Mucking

Mucking this big bore was more like an ordinary earthmoving operation than the usual tunnel excavation. Theo Wood Construction Co., the mucking contractor, used two tractor shovels and a spread of Euclid rear-dumps to load and haul the broken sandstone.

Within two hours after the day's shot was detonated, one of the tractor shovels, either a Caterpillar 977 Traxcavator or an Allis-Chalmers HD-11 Tracto-Shovel, moved up to the heading. Four Euclid S-7 rear-dumps followed the shovel in, and soon they were shuttling in and out with their 12-yard loads of rock.

The tunnel floor was wide enough for the "Eucs" to pass one another at almost any point. Near the heading, they had to pass through the drilling jumbo which had its lower decks raised to provide an ample opening. At the heading, the "Eucs" turned around and backed up to the shovel where they were quickly loaded.

At first, the material was used to build up and improve the road between the portals. Later, the muck was hauled upstream from the tunnel to build a road which leads to Wahweap Creek Canyon. From here, a road leads up to the top of the can-

(Continued from preceding page)

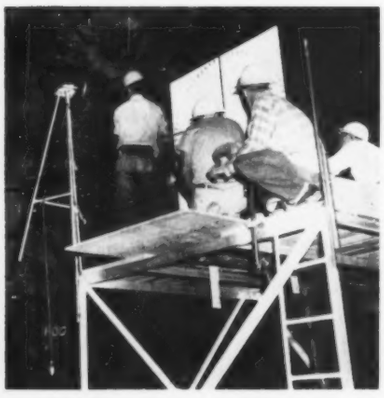
taining three Joy Axivane fans. One at the portal was powered by a 100-hp motor. The other two, spaced at 1,000-foot intervals inside the tunnel, had 75-hp motors. Power for these fans, as well as for the pumps, lights, and other purposes, was supplied by two generators, a GM 6-71 engine with a 125-kw generator and a Caterpillar 75-kw engine-generator set.

Load in circular pattern

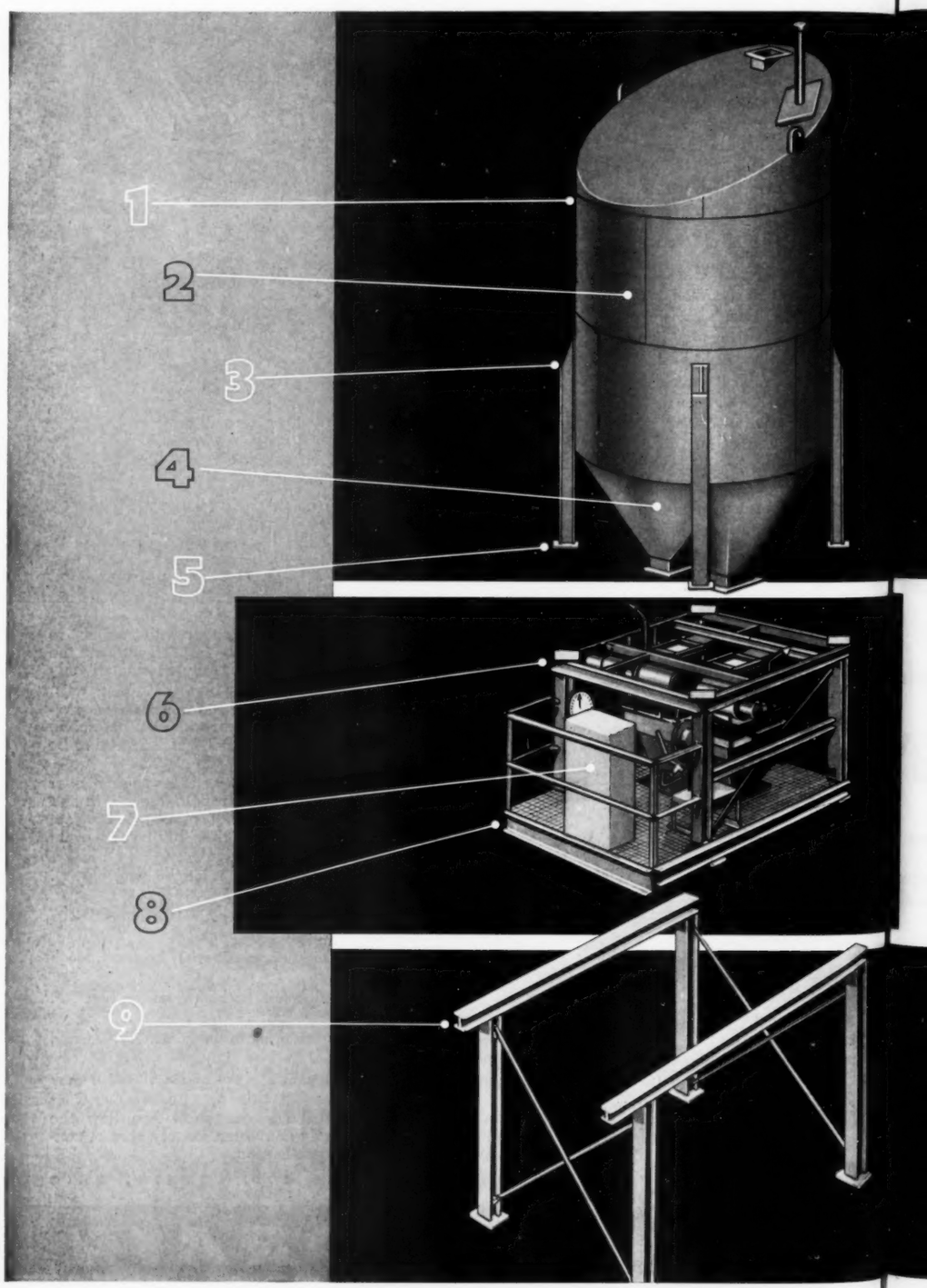
The holes in a round were generally spaced in a series of concentric rings. The center-cut holes were loaded with number 1 and 2 delays to take out a wedge. Rings going out from the center were loaded with number 3, 4, 5, 6, 7, and 9 delays, respectively. Each of the holes was loaded with twelve 1¼×16-inch sticks of dynamite, which was detonated with American Cyanamid 220-volt caps.

In the usual cycle, the drilling crew moved into the tunnel in the morning and completed the drilling by early afternoon. The loading operation required about an hour. When the round was loaded and the jumbo pulled back into the shooting position, all workmen left the tunnel. When the last man was out, the switch was pulled to detonate the charge and terminate that shift.

After allowing a couple of hours for ventilation, the mucking crew moved in during the early evening to muck out the 1,000-plus cubic yards of material during the night.



Working inside the tunnel, USBR inspectors measure the arch of the tunnel and spot overbreaks in the surface from the specially constructed surveyor's cross-sectioning jumbo.



yon. Completion of this road system meant that equipment did not have to be brought out by cableway.

The maximum haul was more than 4,000 feet outside the tunnel, plus the 2,750-foot length of the bore—a distance of more than a mile and a quarter. The average haul was close to half a mile.

When the tunnel had been holed through, the mucking contractor started back, removing the material which had been left in the invert to form the roadway. For this operation, the Euclid S-7 rear-dumps were removed and scrapers substituted. Some rock had to be ripped, but most of it had been broken enough by the shots to load easily. A Galion Model 118 motor grader maintained the road both inside and outside of the tunnel.

All of the diesel-powered machines used in the tunnel were equipped with exhaust scrubbers that removed the dangerous gases. Adding water to these scrubbers every two hours, changing the water every eight hours, and recharging the scrubbers every 30 days consumed a considerable amount of time. The scrubbers were charged with lime, charcoal, and copper mesh.

The project manager for Mountain States Construction Co. on this tunnel was Earl Cooper, who was assisted by superintendent "Shorty" Donoho. The drilling, shooting, and supporting were supervised by superintendent E. R. "Ernie" Moore for Northwood, Inc., with Harold Sieber serving as tunnel foreman. The superintendent of the mucking crew for Theo Wood Construction Co. was Joe Greer. For the Bureau of Reclamation, Earl Edwards served as chief of inspectors on this tunnel.

The job of getting equipment to the bottom of the 800-foot-deep canyon was first handled by this cableway spanning the canyon above the location of the downstream portal. The 3½-inch gut-cable is strung between towers and anchored into rock on both sides. The Euclid end-dump will be spotted near the right bank diversion tunnel.

Left diversion tunnel

Early in September, Frazier-Davis Construction Co., under its subcontract from M-C&S, started work on the left diversion tunnel. To service the upstream portal of this tunnel, M-C&S erected a 100-ton stiffleg derrick at the top of the canyon wall. This big derrick with 122 feet of boom and a 30-foot jib was operated by a Skagit 3-drum winch powered by a Cummins 270-hp diesel engine equipped wih a torque converter.

The derrick first lowered International TD-24 and TD-18 tractor-dozers, an Allis-Chalmers HD-5 Tracto-Shovel, an Eimco 125 tractor-loader, and an Ingersoll-Rand 600-cfm Gyro-Flo compressor. These rigs excavated the upstream portal of the diversion tunnel, built a road along the river's edge to the downstream portal, and excavated the low portal of the powerhouse access tunnel.

Excavation of the access tunnel got under way in October. Drilling is being done from a three-deck jumbo mounted on a Euclid truck bed. Six hydraulic booms, two each on the three levels, carry Gardner-Denver SF93 drills with 10-foot screw feed. The drills handle 1¼-inch round steels and Western Rock Bits with tungsten-carbide inserts to drill the 1¾-inch holes.

While portals will be lined with concrete, the access tunnel will be unlined. Roof supports of 8 and 10-inch wide-flange arches are being supplied by Commercial Shearing & Stamping Co. Bethlehem-Pacific roof-support bolts are also being used.

Excavation of the left diversion tunnel got under way shortly after the access tunnel was started. Here, Frazier-Davis use two "Euc"-mounted jumbos side by side for the drilling. In both tunnels, the air is supplied by

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THE HELTZEL STEEL FORM AND IRON COMPANY
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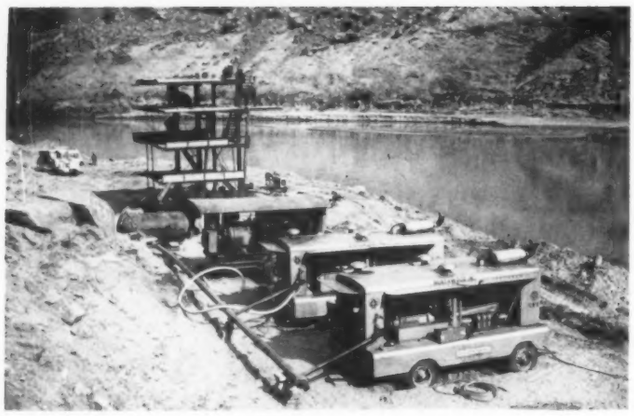

Starting its attack on the sheer canyon walls, Northwood moves in with its 5-deck jumbo for the tunneling operations, and air supply system. Both Gardner-Denver 900-cfm rotary compressors pump into a receiving tank; a pipeline carries air to the drills.

Ingersoll-Rand 900 and 600-cfm Gyro-Flo compressors.

Mucking in both tunnels is being done with Eimco 105 tractor shovels and Westinghouse - LeTourneau D Tournarockers. In the big diversion tunnel, two Eimcos do the loading, while one handles the operation in the smaller access tunnel.

At the upper end of the powerhouse access tunnel, some two miles away from the low end, Gibson & Roberts, Inc., got an earlier start. By early September, the portal had been excavated and the tunnel started. But a fall-in at the portal, which took the life of one workman, slowed this operation. Before work could be resumed, a net of wire mesh fencing was spread over the rock face above the portal and securely anchored into firm rock with roof-support bolts.

Gibson & Roberts used a "Euc"-mounted jumbo with hydraulic booms similar to the one used by Frazier-Davis; mucking was done with an Eimco 105 loader and Koehring Dumptors. Air for drilling was supplied by Ingersoll-Rand 900-cfm compressors.

This powerhouse access tunnel follows the approximate alignment of the canyon wall, staying a minimum of 50 feet away from the canyon. The tunnel is being mined about 23 feet high and 20 feet wide in a horseshoe shape. It has a continuous grade of about 8 per cent. Adits spaced every 500 feet bring daylight into the canyon for light and ventilation.

Power for lighting in the tunnel, and for fans, pumps, and other electrical equipment is supplied by a GM 6-71 generator set, left, and the Caterpillar generator set.

This tunnel is being mined in two sections, each about 4,000 feet long. One starts at the top, the other from the bottom. Near the middle, both tunnels will daylight on an open bench where the access road will break out of the tunnel.

Spillway tunnels

The other tunneling operations, which will come later, are for the two spillway tunnels. Merritt-Chapman & Scott Corp. is now excavating the intake channels on both sides of the river. When these are down to grade, the tunnels will be drilled down at an angle to meet the diversion tunnels.

Personnel

The project manager for Frazier-Davis Construction Co. on the tunnels is R. P. "Bob" Molten with Joe Burlarlay serving as project superintendent. On the Gibson & Roberts, Inc., spread, W. J. "Bill" Roberts is project manager and Paul Wilson, superintendent.

For the Bureau of Reclamation, Bill Donahue and Earl Edwards are field inspectors. THE END

ON THE CONNECTICUT TURNPIKE

No place for trucks you have to "baby"! Gammino's Macks are hauling close to *seven million* yards of rock and earth as the Connecticut Turnpike is rushed to completion. That means those mighty shovels are really moving as they drop the heavy, jarring loads of rock into the trucks beneath. It also means that Gammino's Macks are taking tremendous punishment, both from the hustling shovels and from the makeshift roadbeds over which they operate in an endless loading-dumping cycle.

"Sure, it's backbreaking work for any other truck," says Mr. Gammino. "That's why we use Macks."

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Want the real pitch on Mack can-do?

Ask Frank Gammino of M. A. Gammino Construc Company, Providence, Rhode Island. He'll talk Ma with you all afternoon.

Ask him about the small but important jobs, w Mack economy enables him to deliver at a pr

Ask him about the big jobs, where the power schedule-meeting dependability of his Macks pace entire operation.

And ask him about the really rugged jobs– chassis-jolting rock-loading jobs . . . the up-to- hubs-in-mud jobs . . . the jobs where his Macks w round the clock, rushing out big-yardage loads weeks on end without a break or a breakdown.

Then ask him why he has still *more* Macks on o We'll stand on that. Mack Trucks, Inc., Plainf New Jersey. In Canada: Mack Trucks of Canada,

YEAR AFTER YEAR IN THE U.S.A., MACK DIESEL TRUCKS OUTSELL ALL OTH

Stone & Webster develops welding method for pipe

An arc-welding process which eliminates the need of metallic backing rings or inserts when welding butt joints in pressure piping systems has been developed by Stone & Webster Engineering Corp., Boston, Mass.

A major feature of the technique is the novel manner of preparing the root edges of the joint. Root edges are bent to produce an internal circumferential lip. When edges of this type are fused together in an inert gas atmosphere, the concave condition associated with fixed yield welds is eliminated. Another innovation of the process is the method of burning up the paper dams with an oxyacetylene flame or stress relieving coils.

Ill. highway contractors offer three scholarships

Highway contractors in Illinois are materially aiding high school students of that state considering highway engineering as a career. Two $4,000 scholarships are provided each year in the department of civil engineering at the University of Illinois. In addition, a $1,200 award is available to a graduating university senior in highway engineering, for travel by car during the summer following graduation.

The two $4,000 scholarships, known as Associated General Contractors of Illinois scholarships, were first awarded in 1955. One is financed by the association and the other is financed by two contractors of the organization, S. J. Groves & Sons Co., Springfield, and McDougal Hartmann Co., Peoria. The travel award, financed by an anonymous contractor, entitles the winner to travel during the summer to study and report on highway transportation problems in the states visited.

Jet-flame process pierces rock on Seaway project

The rocket-jet principle used to power modern jet aircraft has been adapted to sink blast holes in rock on the St. Lawrence Seaway project. The process works on the rocket principle and makes it possible to pierce rock at speeds up to ten times faster than conventional drilling methods. Actually a modified churn drill, it was developed by the Linde Co., Division of Union Carbide Corp., New York, N. Y., in cooperation with the Bucyrus-Erie Co., South Milwaukee, Wis.

The jet-piercing rig sinks a blast hole on the St. Lawrence Seaway project. The rig, converted from a Bucyrus-Erie Model 27T churn drill, uses a rocket-jet principle adapted for this use by the Linde Co. in cooperation with Bucyrus-Erie.

Intensely hot, supersonic jets of flame are the key to the process. Traveling five times faster than the speed of sound and reaching temperatures of 4,000 degrees F, the flame spits out of a rocket-type burner and disintegrates or spalls the rock in its path. Disintegrated rock particles are thrown up out of the hole by the combined force of burning gases and steam. The surface is continually exposed to the jet flame.

The only limitation to penetration depth is the length of the hoses—carrying fuel, oxygen, and water—that are lowered into the hole. To date the deepest penetration is 160 feet.

Heltzel, Leap join to design, make forms

The Heltzel Steel Form & Iron Co., Warren, Ohio, maker of steel forms for concrete shaping, has joined with Leap, Inc., Lakeland, Fla., design firm, to design and manufacture a complete line of forms and accessories for the manufacture of prestressed-concrete products.

Leap designs, used in prestressed yards, include single and double-tee forms, keystone joists, bridge beams and decks, square and octagonal piling, channels and specials. The new form line, manufactured by Heltzel, will be offered through established Heltzel dealers.

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ON THE PROVIDENCE RIVER BRIDGE JOB

Gammino's Macks are keeping big buckets busy. Concrete, not excuses, is what this job calls for—any late deliveries mean expensive, profit-robbing delays. "With Macks on the job," says Mr. Gammino, "no one sits on his hands."

EPEND ON MACKS

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. . . a wise contractor keeps a close eye on running costs—fuel, maintenance, down time, tire wear, etc. Mr. Gammino does just that, and he reports: "Nothing touches a Mack for ton-mile economy."

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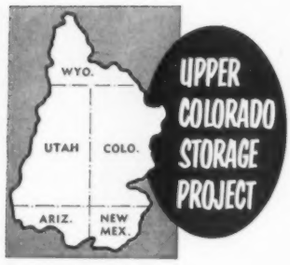
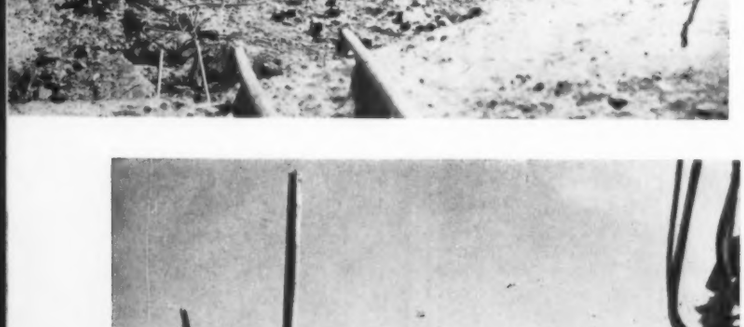


Following the blast to break sandstone for spillway tunnel excavation, a Lima uses its 4-yard dipper to start loading out to one of the International Payhaulers. The TD-24 cleans up. The big light tower, powered by a Cat D311 generator, provides light for the night shift.

Amid maze of preparatory work, excavation initiates Glen Canyon spillway inlet tunnels

First phase of huge job begins as work continues on living quarters, offices, shops, power plant, cableways, aggregate and concrete plants



On the edge of the canyon, across from similar work on the left spillway intake area, Gardner-Denver Air Tracs and Joy drills bite into the sandstone with Liddicoat 3-inch bits. The 24-foot holes are on an 8-foot gridiron plan. Loading out continues.

Additional photo on front cover

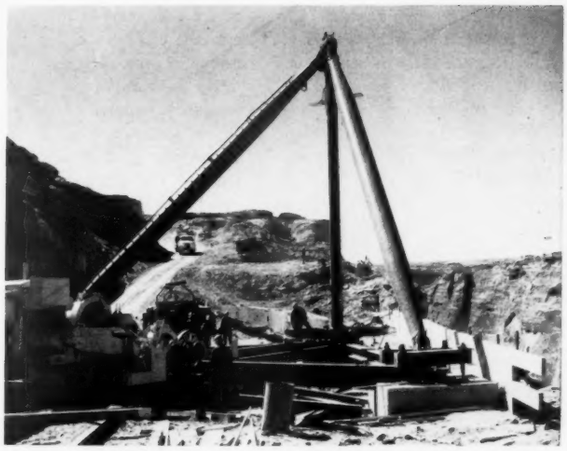
Starting a $108 million contract is a big job in any location, but for Merritt-Chapman & Scott Corp., New York City, the start of operations at Glen Canyon Dam was even more complicated than usual. The remote location, lack of means of communication, and lack of transport across the canyon were the biggest problems.

At the dam site, and for some miles above and below, the canyon is only about 1,200 feet wide, but it is more than 700 feet deep and enclosed by walls that are almost vertical. The trip by road from one side of the canyon to the other is 225 miles over a combination of paved highways,

Work on the left bank spillway intake is virtually the same as on the opposite side. Here, too, Gardner-Denver Air Tracs are sinking the blast holes.

Air for drilling is supplied by Joy compressors. Pipe carries air onto the Beehive where drillers are cutting away the left face to make room for the cableway.

Two truck loads of parts for a Lima 1601 crane pause on the long, tough haul to the site. The nearest railhead is at Flagstaff, Ariz., 135 miles by road from the left bank of the canyon. Marysvale, 174 miles away, is the nearest railhead to the right bank.



A preliminary job on the left bank is setting up a big stiff-leg derrick to service operations at the bottom of the canyon. The Skagit hoist, left, is powered by a Cummins 270-hp diesel engine.

gravel roads, and desert trails.

Airstrips 7 miles apart on either side of the canyon were used by light planes that frequently shuttled USBR survey crews and crews of the bridge contractor, who started building the highway bridge across the gorge before the start of the big prime contract on the dam.

By the time M-C&S began moving onto the site in June, Kiewit-Judson Pacific Murphy, the joint-venture on the bridge contract, had a cableway operating across the canyon. When it was available, the cableway was leased to M-C&S and other firms that had to transport personnel, light materials, and equipment from side to side.

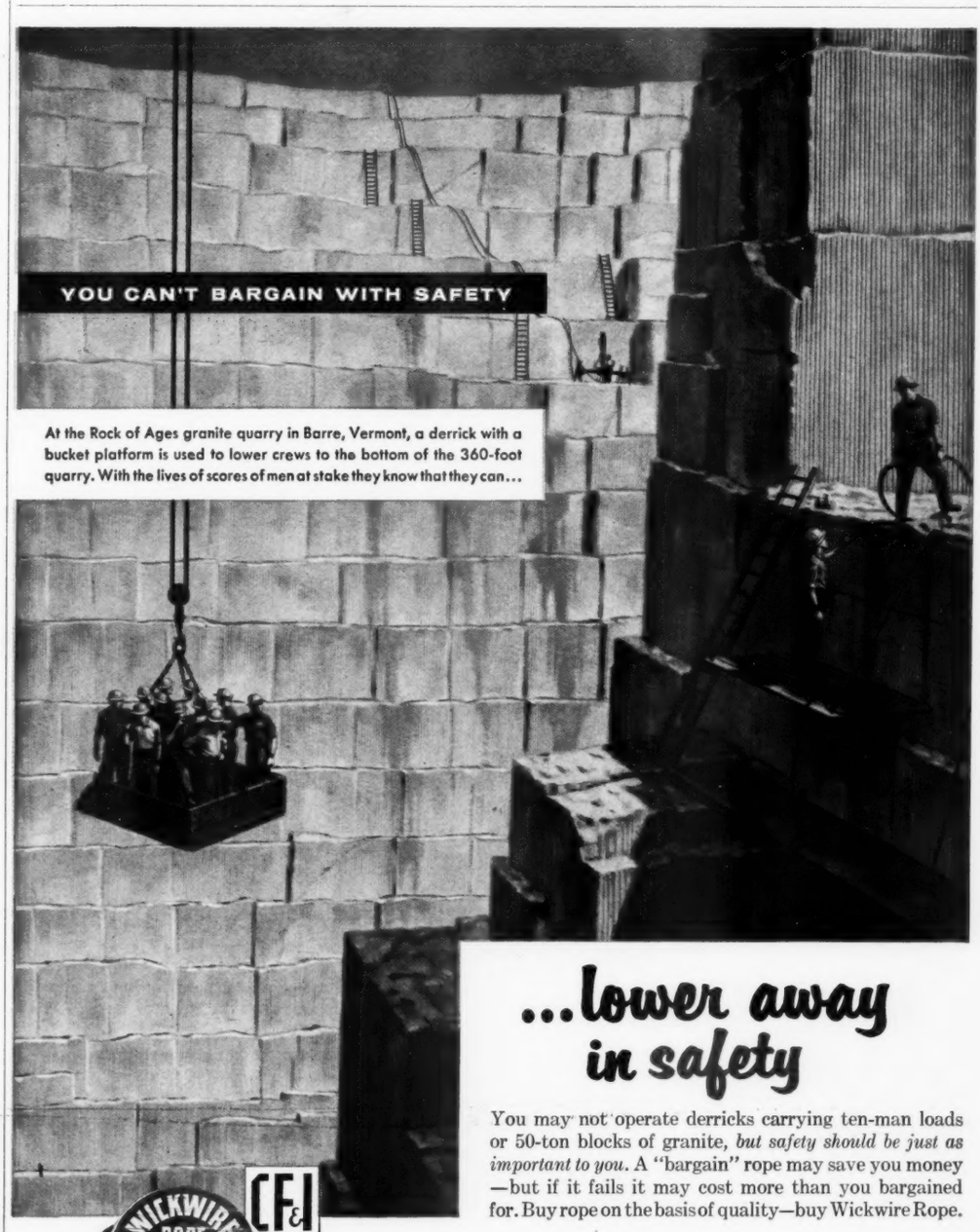
Even getting materials and equipment to the site is a tough job, requiring long truck hauls over the desert roads. The nearest railhead is at Flagstaff, Ariz., 135 miles south of the left or east bank of the canyon. Flagstaff is also the closest city of any size on that side. From the west bank, it is 76 miles to Kanab, Utah, a tourist center of about 1,200. It is another 98 miles from Kanab to the nearest railhead at Marysvale, Utah.

With the completion of the east bank access road (see pages 26–27) a paved highway was provided from Page, Ariz.—the town being built on the east side of Glen Canyon—to Flagstaff. Portions of the road from Kanab to the west side of the canyon have been regraded and paved, but one section through the rugged Cockscomb Range has just recently been started by the Utah Highway Department. Until it is completed, the traffic must use a steep, narrow, winding road which is subject to washout during heavy rains.

While mobile radio communication is extremely valuable to the contractor in all stages of the work, the General Electric mobile radio system was a real life-saver during the early stages of this project. With only one telephone line between the field office at the job site and the project office at Kanab, communications were often handicapped.

On the job site, the only communication was by the GE mobile radio system. Units were installed in the cars and pickups of principal supervisory personnel and in the field of-

(*Continued on next page*)



At the Rock of Ages granite quarry in Barre, Vermont, a derrick with a bucket platform is used to lower crews to the bottom of the 360-foot quarry. With the lives of scores of men at stake they know that they can...

...lower away in safety

You may not operate derricks carrying ten-man loads or 50-ton blocks of granite, *but safety should be just as important to you.* A "bargain" rope may save you money—but if it fails it may cost more than you bargained for. Buy rope on the basis of quality—buy Wickwire Rope.

WICKWIRE ROPE — A CF&I PRODUCT

LOOK FOR THE YELLOW *TRIANGLE*

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N.M.) • Fort Worth • Houston • Kansas City • Lincoln (Neb.) • Odessa (Tex.) • Oklahoma City • Phoenix • Pueblo Salt Lake City • Tulsa • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco • San Leandro Seattle • Spokane • **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia

For more facts, use Request Card at page 18 and circle No. 235

(Continued from preceding page)
fices on both sides of the canyon.

Transportation by aircraft also proved useful in several ways, especially during the early months of the work. Key supervisory personnel utilized local charter plane service and the M-C&S Twin Beechcraft plane for quick transportation between Kanab and the job site. Since no regular air service was available at Kanab, the Twin Beech was frequently pressed into service to make flights to key cities around the country to pick up urgently needed supplies or repair parts.

Set up temporary offices

Setting up temporary offices in Kanab, M-C&S began to assemble and store materials and equipment at the railheads, trucking them to the job piece by piece as preliminary work started. Temporary field offices were set up on the project site, and a group of house trailers was brought in on each side of the canyon to house the first workmen.

Subcontractors immediately began construction of dormitories and dining facilities on both sides of the canyon. Before the end of September, there were three 80-room dormitories and a large mess hall in operation on each side. These are Armco and Butler light metal buildings, lined inside, completely air-conditioned, and fully equipped.

This small machine—an International 350 wheel tractor with Davis 185 backhoe and Davis front-end loader—does its bit on the $108 million project. It is excavating a sewer trench for a trailer camp site for M-C&S personnel.

Daily arrivals of new trailers filled up the camp areas as soon as water, sewers, and electric power could be made available. In addition to the trailer area provided at the Page townsite and an area provided by private interests near the west side, there was a separate area, prepared by M-C&S near its west-bank office location, for the trailers of both supervisory and office personnel and their families.

With families on the site, another problem arose—that of schooling for the children. Last September, a temporary school was opened in a converted warehouse building at Page with more than 100 students enrolled. With limited access across the canyon, families with children had to live on the east side, even though this means that some of the men have to ride the cableway or walk the footbridge to work each day.

The next structures to rise on the west-bank camp site were a group of Butler and Armco buildings for the permanent field offices and shops. One of the office buildings measures 144×124 feet. A 60×120×20-foot-high shop building has 10 equipment stalls and seven rolling steel doors. The attached warehouse has the same plan size.

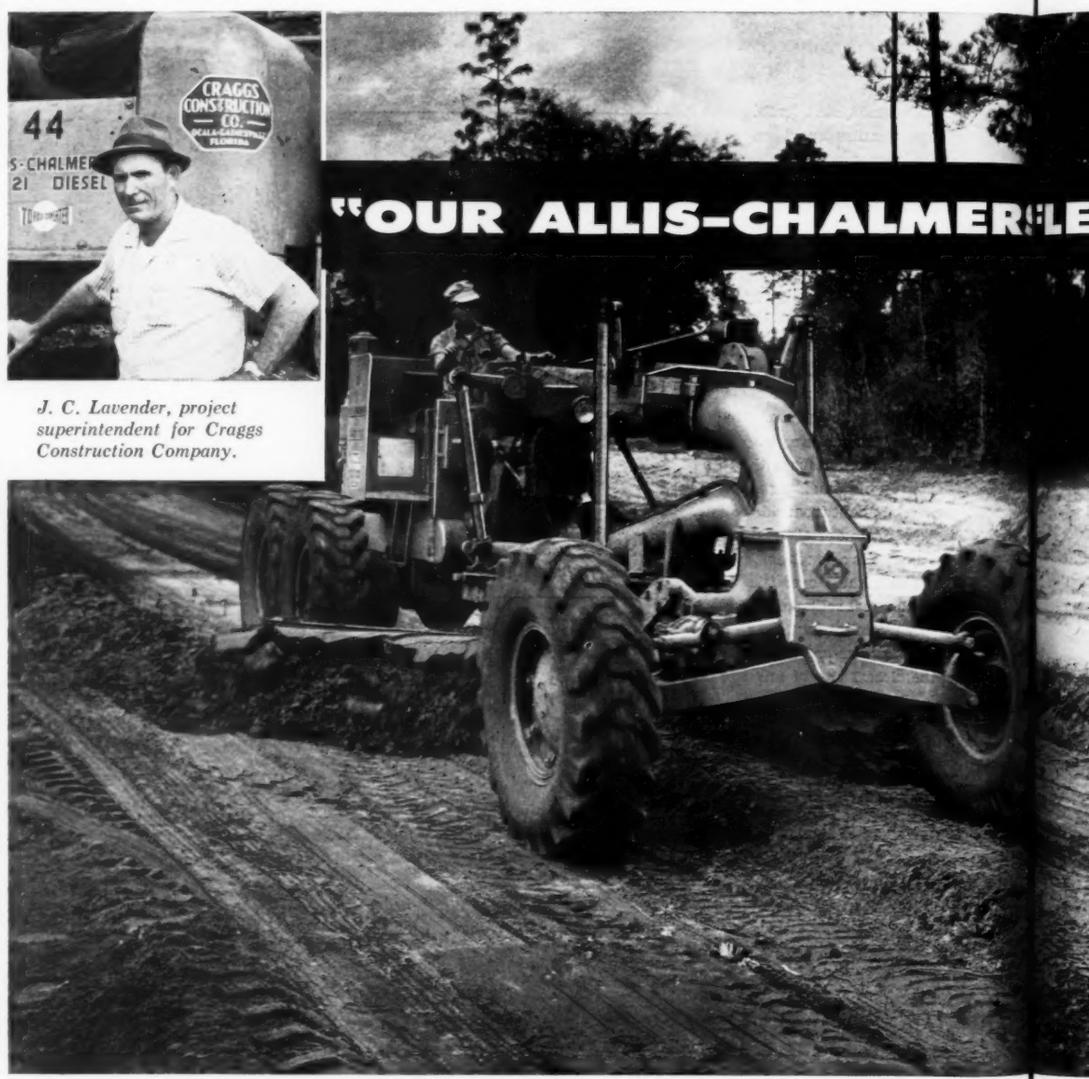
Several smaller buildings house the lubrication shop, tire shop, rigging loft, electric shop, and plumbing shop. Across the canyon is a similar setup on a smaller scale. The shop buildings were being used before they were even completed; the office forces transferred most of their activities to the job site during October.

Build power plant

Since the prime contractor is required to supply electric power for his own operations and for the town of Page during the construction period, the construction of a power plant was another early project. Housed in a 70×180-foot Armco light metal building, the power plant contains an ini-

A first requisite at the site was a power plant to supply construction areas and the town of Page. Four diesel 1,360-kw generator sets make up the initial installation in this Armco building; more will be added as power demands increase. ►

J. C. Lavender, project superintendent for Craggs Construction Company.



Forty Five motor grader puts finishing grade on roadbed. Notice how the ROLL-AWAY moldboard keeps load live and rolling.

Big, powerful HD-21's clear right-of-way and level fill. Torque converter drive makes big production easy for operator . . . easy on tractor and equipment.

tial installation of four Fairbanks-Morse 1,360-kw diesel-generator sets. More units will be added as needed.

Power is generated at 4,160 volts and transmitted to nearby facilities at that voltage. For transmission across the canyon to Page and to other distant points, the voltage is stepped up to 12,000 volts. With the installation of a big refrigerating plant, a concrete batch plant, and an aggregate production plant, it is anticipated that the demand may build up to as much as 20,000 kilowatts.

Start excavation and tunnels

The schedule of contract operations during the seven years that the dam will be under construction made it necessary to start immediately on certain operations even though camp facilities were far from complete. The two long diversion tunnels must be completed before any work can be started in the bottom of the canyon.

Since the spillway tunnels join the diversion tunnels, they must be completed before the river is diverted. This means that the spillway inlet channels must be excavated as early as possible.

Vehicular access to the bottom of the canyon can be had only when the access road to the powerhouse area—a 2-mile-long tunnel—is complete. This gives the tunnel high priority for early completion.

The right diversion tunnel, which was awarded as a separate contract, has been holed through, and lining will start this month. The other tunnel operations were subcontracted to Frazier-Davis Construction Co., St. Louis, Mo., and are progressing rapidly.

Meanwhile, M-C&S has moved in two spreads of their own new equipment to excavate the spillway inlet channels. These channels, shaped like the thumbs of a huge pair of mittens, must be excavated to a depth of 130 feet in the sandstone banks of the canyon.

On the west bank, a battery of Gardner-Denver Air Trac drills using Liddicoat 3-inch bits punched 3-inch holes in the sandrock on an 8-foot gridiron plan in 24-foot lifts. The holes were loaded with dynamite and shot every afternoon at the end of the day shift.

Two Lima Model 1601 shovels with 4-yard dippers scooped up the broken rock into a spread of 10 International Payhaulers, and these carried the material to a waste area which was built up as a parking area for equipment and a storage yard for materials.

Air for this and other drilling operations was furnished by a bank of Joy 600 and 900-cfm compressors which pumped into a common receiving tank. From this tank, the air was piped to the drilling areas in Wade aluminum pipe.

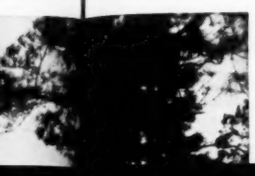
The operation in the left spillway area was similar. Drilling was done with Gardner-Denver Air Trac drills powered by Joy compressors. The rock was loaded by a Marion M-93 shovel and hauled by a spread of the new International Payhaulers. There were 20 of the 24-ton Payhaulers on the project.

Build big cableways

Two big cableways will place the concrete for the dam. Rated at 50 tons capacity, the two will have rolling head and tail towers that will traverse 1,000 feet or more. One will be higher than the other so that they can operate back and forth over and under each other without interference. These cableways will handle 12-yard concrete buckets at high speed.

A third cableway of 25 tons capacity will handle 8-yard buckets in the powerhouse area. This cableway has been erected on stationary towers over the diversion tunnel portals to

←For more facts, circle No. 236



ER FLEET HELPS US BID LOW

...finish the work on schedule"

. . . that's what J. C. Lavender, superintendent for the Craggs Construction Company, Ocala and Gainesville, Florida, says about his company's Allis-Chalmers fleet.

Craggs Construction Company was awarded a 14½-mile job on Florida State Route 207, an important farm-to-market road in the heart of the potato growing area. The contract called for widening, filling, straightening out several sharp curves, and constructing a large number of drainage ditches.

Here are the Allis-Chalmers machines that did the bulk of the work: 4 motor scrapers, 4 motor wagons, 13 crawler tractors, 4 pull-type scrapers, 5 motor graders.

This Allis-Chalmers fleet moved approximately ½ million cubic yards of material from 5 borrow pits for filling and stabilizing. Almost 200 acres of land were cleared and grubbed by bulldozers as the right-of-way was widened to accommodate a 24-foot pavement with 8-foot shoulders.

Whenever you have to move dirt in a hurry — on large jobs or small — investigate the many reasons for going Allis-Chalmers. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

Engineering in Action

ROLL-AWAY is an Allis-Chalmers trademark.

Forward forced ejection and high apron opening provide fast, clean, unobstructed dump and smooth, controlled spread. This keeps fill area in good operating condition . . . contributes to better compaction.

Curved cutting edge and offset center bit of Allis-Chalmers motor scrapers mean no corner voids . . . a full payload every trip.

Excavated material is being used to build up an area for a storage yard and parking lot for equipment. As the International Payhauler makes a dump, the material is spread by the TD-24.

Work on an access road on the left bank is done by a Marion 93-M shovel, which loads an International Payhauler. While this is being done, cleanup is handled by a Cat D8.

handle 8-yard concrete buckets for the tunnel lining operations. Rolling head and tail towers will be installed later.

To make room for the traveling towers of the big cableway, the contractor had to excavate several thousand cubic yards of rock from a huge formation called The Beehive. This excavation has been a spectacular part of the work during the past few months.

Develop aggregate source

The specified source of aggregates for the dam is in a deep canyon about 7 miles from the right abutment known as Wahweap Creek Wash. The gravel bed here averages 25 feet deep and, covering the entire bottom of the wash, averages 700 to 800 feet wide for a length of 4 miles or more. Water stands at a depth of about 10 feet below the surface.

To make a complete survey of the potential pit, the contractor put down a 30-inch test hole every 400 feet throughout the area. A Calweld earth-boring machine, using a light metal casing to keep material from flowing into the hole, did the drilling.

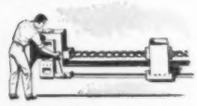
The complete sample taken from each hole was screened in an ingenious machine made especially for this purpose by Overstrom Co., Los Angeles, Calif. This device is a miniature screening plant with three 2× 6-foot decks powered by a Wisconsin engine. The material brought up by the auger was dumped into a conveyor which carried it to the screening plant. This plant separated the material into four sizes: minus ¾-inch; 1½-inch; 3-inch; and 6-inch. As the several sizes came out of the screening plant, they were caught in separate wheelbarrows and weighed on a small platform scale.

Further refinement of tests on the smaller sizes was obtained by running one-tenth of the minus ¾-inch sample through a set of standard laboratory test screens.

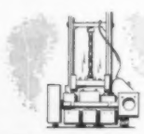
Based on the information obtained in this survey, a screening and washing plant was set up to produce aggregates for the tunnel-lining concrete. Plans are now being prepared for a heavy-media processing plant to produce the huge volumes of aggregates for the dam. A completely new road will be graded from the site of the gravel pit to the concrete plant

SHOCK-PROOFED!

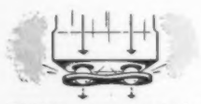
DIAMOND Chain parts are *shot-peened* (bombarded at high speed with tiny, chilled iron pellets) to increase the inner toughness and load-carrying capacity.



DIAMOND Roller Chain is pre-loaded and tested before shipment. Parts are seated, initial stretch taken out.



DIAMOND Roller Chain is shock-tested and fatigue-tested at loads and speeds far exceeding actual operating service requirements.



DIAMOND pin holes are ball drifted (DIAMOND'S own patented process) to assure a uniform, mirror-smooth diameter. Full press fit holding power of assembled pins and bushings provides great shock load resistance.

DIAMOND ROLLER CHAINS are built to withstand the shattering blows and overloads of your toughest jobs!

DIAMOND'S **tough!** DIAMOND Roller Chain takes peak shock loads in stride . . . reacts with resilient power under severe use and abuse.

DIAMOND'S **hard!** Case-hardened pins, bushings and rollers resist wear, abrasion, friction damage . . . keep DIAMOND chains working day in, day out, month after month.

DIAMOND'S **durable!** Lab tests equal to *years* of on-the-job punishment have led to many major improvements in DIAMOND Roller Chain . . . improvements that mean greater fatigue resistance, longer service life to users.

● END DOWNTIME DELAYS! Your DIAMOND Distributor has all types and sizes of Roller Chain *in stock*, ready for instant delivery. Look under "Chains" or "Chains, Roller" in the YELLOW PAGES . . . or write to factory for latest catalog and name of your nearest Distributor.

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A Subsidiary of American Steel Foundries
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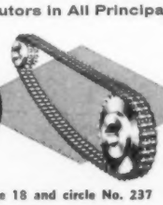
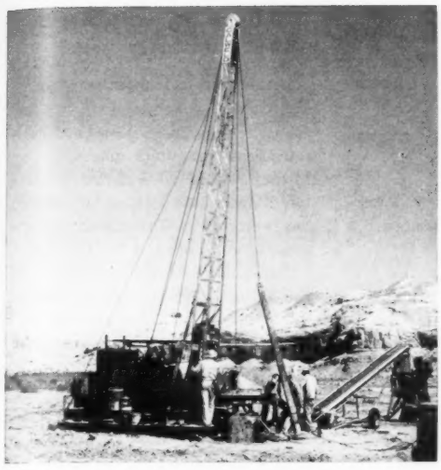
Offices and Distributors in All Principal Cities

DIAMOND  ROLLER CHAINS

For more facts, use Request Card at page 18 and circle No. 237



A major problem as the job starts is developing an aggregate source. In the gravel pit area, a 30-inch test hole is put down by this Calweld rig. A heavy steel cap protects the casing while the hammer, a section of 6-inch-square kelly rod, is dropped by the Calweld earth-boring machine.

A miniature screening plant built by Overstrom Co., Los Angeles, Calif., and powered by a Wisconsin engine, breaks the aggregate sample into four sizes ranging from 6 to minus ¾-inch. Each size goes into a wheelbarrow for weighing on the platform scale, foreground.

at the right abutment of the dam.

Concrete plants

A Johnson 8-yard concrete plant is being set up on the right bank of the canyon to produce the concrete for tunnel linings and other miscellaneous uses during the next year. This fully automatic plant has a 450-ton, 5-compartment bin and two 4-yard mixers. A much larger plant will produce the concrete for the dam.

While primary emphasis is being placed on the camp, plant setup, and the tunnels this winter, the engineers are planning detailed schedules of operations for the next seven years so that the work will advance smoothly from one stage to the next. This is a herculean task, as even the cement requirements show. Some 3 million barrels of cement are required for the dam, and the firm furnishing and delivering the material may decide to build a cement plant at the site. To deliver the 5 million sacks of cement and pozzuolana to the dam, a man in the Bureau figured, a 20-ton truckload would have to arrive at the dam every 40 minutes, 24 hours a day, 7 days a week, for 4½ years.

Personnel

In over-all charge of the big project

(*Continued on next page*)

M-C&S superintendents go over a phase of the project. Left to right are Whitey Condaux, carpenter superintendent; Forrest Jones, general superintendent; and R. G. Roper, rigging superintendent.

HAYNES Alloys solve the *tough* wear problems

NO MAINTENANCE FOR 2 YEARS

Trouble-free mining operation in abrasive muck with HAYNES Alloy

Ordinary bearings and rollers couldn't take this punishment and lasted about 3 weeks. But when these rollers were built-up and hard-faced with HAYNES STELLITE alloy No. 6, service life was extended to years instead of weeks!

Whether your equipment handles rock, sludge, or acid—where there's a serious wear or corrosion problem, you will find that a HAYNES alloy will reduce maintenance and replacement costs. For complete information about hard-facing, write for the Hard-Facing Manual. Address HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, Kokomo, Indiana.

Constantly and completely covered with abrasive muck. This equipment, deep in the mine, gathers and transports ore at the digging sites. Parts were hard-faced right on the job—almost 600 ft. below the earth's surface—with HAYNES STELLITE alloy No. 6 rod.

See... or *Write...* Your local Haynes Stellite Dealer to Haynes Stellite Company

For more facts, use Request Card at page 18 or circle No. 238

(Continued from preceding page)

for Merritt-Chapman & Scott is William Denny, executive vice president for M-C&S' Construction Department. The firm's project manager is H. S. "Herb" Booth, whose big job since the bidding has been the planning and scheduling of the work.

Others on the supervisory field staff are general superintendent Forrest H. Jones, business manager L. E. "Ex" Hoyne, left bank superintendent W. R. "Bill" Moulton, rigging superintendent R. G. "Glen" Roper, equipment superintendent W. L. "Lee" Smith, purchasing agent R. G. "Dick" Park, materials engineer J. M. "Jack" Wells, office engineer Jack Gregg, chief electrical engineer Chester A. "Chet" Porter, electrical superintendent H. W. Laurance, and master mechanic J. A. "Art" Moran.

The Upper Colorado Storage Project, of which the Glen Canyon unit is a part, was planned and is being supervised by the Department of the Interior, Bureau of Reclamation. The commissioner of the Bureau is W. A. Dexheimer. The chief engineer of the Bureau is L. N. McClellan. This project is located in Region 4, which has O. E. Larson as regional director. The project construction engineer for the Glen Canyon Unit is L. F. "Lem" Wylie, and the office engineer is Howard L. Fink. The field engineer on the project is Byron David. Norman W. Keefer is chief of the general engineering section; William C. Donahue, chief inspector; Richard J. Hannon, chief of field surveys; James H. Fordham, administrative officer; Carl V. Gezelius, materials engineer; and Reuben C. Gaulke, safety officer.

THE END

American Photocopy opens Detroit sales office

The American Photocopy Equipment Co., Chicago, Ill., has opened a Detroit, Mich., sales office at 10611 W. McNichols Road. All operations formerly located at 16138 Wyoming Ave. have been moved to the new location. The new building has 3,000 square feet of office space, double the size of the previous headquarters.

Apeco's new Detroit office is headquarters for the region's 14 district sales areas in Michigan, Indiana, and portions of Ohio and Kentucky.

moneymakers*

*HENDRIX

DRAGLINE : BUCKETS

The combination of Hendrix performance . . . faster loading . . . easier handling . . . and cleaner, smoother dumping add up to increased profits on every operation.

"A Type for Every Digging Purpose"

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

For more facts, use Request Card at page 18 and circle No. 239

AED book on rentals shows rates going up

Rental rates for construction equipment are keeping pace with the spiraling cost of living. Just how much rates have gone up is underscored by the new "Compilation of Rental Rates for Construction Equipment", which has been published this month by the Associated Equipment Distributors.

This ninth edition of the book lists the national average rental rates on some 2,000 pieces of construction machinery and equipment. These are not prevailing rates in any section of the country, but rather the national averages worked out after a two-month survey of the Association's more than 700 members.

Rental increases, on a percentage basis, show a marked trend upward for several types of equipment. Portable compressors, for instance, have registered an increase of from 1 per cent in the smaller sizes to 10 per cent in the larger sizes; the over-all average is 4 per cent. Crawler-mounted, gasoline-powered cranes are up 4 to 8 per cent. Dragline rentals are from 3 to 4 per cent higher, while shovels have gone up from less than 1 per cent to as much as 8 per cent. A 14 per cent increase has been registered for crawler-mounted, self-propelled finishing machines.

The new edition may be obtained from Associated Equipment Distributors, 30 E. Cedar St., Chicago 11, Ill., at $5 per copy.

Litton, Monroe to merge

Litton Industries, Inc., Beverly Hills, Calif., makers of electronic computers and controls, electronic components and similar products, will merge with the Monroe Calculating Machine Co., Orange, N. J. Under a purchase offer made by the Litton board, and accepted by stockholders representing about 80 per cent of Monroe stock, Monroe stockholders have the choice of 1½ Litton common shares for each share of Monroe, or half a share of Litton $100 par value 5 per cent preferred for each share of Monroe common.

Monroe, with manufacturing and sales facilities throughout the U. S., and in Canada, Great Britain, France, Venezuela and the Netherlands, has estimated sales this year of more than $40,000,000. Litton's sales are said to be running at the rate of more than $45,000,000.

Alexander Mfg. Co. marks 10th anniversary

Alexander Mfg. Co., Picayune, Miss., maker of AMCO farm and industrial equipment recently celebrated its tenth anniversary. The company maintains a research program to develop new tools, improve its present equipment, and to keep in step with progress. Their newest introduction in the construction field is an offset model harrow mounted on dual pneumatic tires.

Top officials of the firm are Paul Garner, president, and Emory Hodgson, vice president and sales manager.

avoid legal pitfalls

Bankruptcy discharged material supplier's claim

THE PROBLEM: *The New York Lien Law makes it larceny for a public improvement subcontractor to fail to apply to labor and material claims funds received from the contractor; the funds being regarded as trust funds for that purpose. The federal Bankruptcy Law provides that a bankrupt's discharge from listed debts shall not include claims based on his fraud, embezzlement, or misappropriation of funds held in a fiduciary capacity. A supply company sold materials to subcontractors, who later received payment from the general contractor but who went through bankruptcy without fully paying for the materials. But it did not appear that the subcontractors had failed to apply all of the funds received from the general contractor to labor and material claims. Was the particular supplier's claim for an unpaid balance discharged by the final bankruptcy decree?*

THE ANSWER: Yes. (Ryan Ready Mixed Concrete Corp. v. Caristo, 158 N. Y. Supp. 2d 451, decided by the New York Supreme Court, Special Term, Kings County.)

The court said that the subcontractors' failure to pay the supply company the full amount due for materials delivered did not necessarily show that the funds received from the general contractor had been misappropriated.

Crediting payments

THE PROBLEM: *A contractor owed both subcontractor and material supplier. He issued a partial payment check payable to both, without specifying how the payment should be credited by the payees. Did the material supplier have a right to apply the full amount of the check to what was owing the subcontractor, leaving the material supplier's claim against the prime contractor outstanding?*

THE ANSWER: Yes. (Piedmont Engineering & Construction Co. v. Hanna Paint Co., 98 S. E. 2d 137, decided by the Georgia Court of Appeals.)

The decision follows a generally recognized rule of law that when one who owes two or more separate debts makes a payment, he has a right to designate which shall be credited, but if he fails to do so the creditor can choose.

For more facts, circle No. 240→

Edited by A. L. H. STREET
Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Measuring the damages for improper construction

THE PROBLEM: *A contractor agreed that the grade of a driveway serving a home would not exceed 10 per cent. After unexpectedly encountering rock and to avoid excavating it, the contractor constructed the driveway on a 22½ per cent grade. That grade was dangerous and inconvenient. Was the contractor liable to the owner for the cost of reconstructing the driveway to make it conform to the agreement?*

THE ANSWER: Yes. (Bellizzi v. Huntley Estates, Inc., 143 N. E. 2d 802, decided by the New York Court of Appeals.)

The court, speaking of construction contracts generally, noted that it is a well settled rule of law that the difference in values governs only when the particular defect in performance cannot be corrected.

Licensing law void on tile contracting

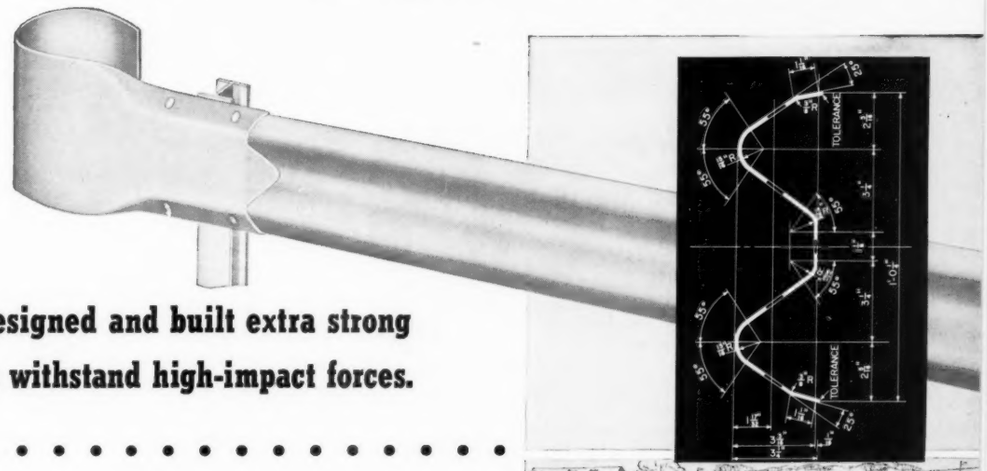
THE PROBLEM: *A North Carolina law forbade unlicensed persons or corporations to "lay, set, or install ceramic tile, marble, or terrazzo floors or walls in buildings for private or public use". It exempted contracts not involving more than $150 and contracts involving state institution buildings. Unlicensed persons, and "any architect, engineer, or contractor who receives or considers a bid from an unlicensed contractor" was subject to a fine of not less than $200 or less than two months imprisonment, or both. Was the law void as unreasonably restricting a constitutional right to pursue a useful occupation and as tending to create a monopoly of the industry by those whom the state licensing board might deem qualified to engage in the business?*

THE ANSWER: Yes. (Roller v. Allen, 96 S. E. 2d 851, decided by the North Carolina Supreme Court.)

The court decided that the law could not be upheld as a measure designed to prevent fraudulent practices by tile contractors, in view of lack of

Another Important Highway Product by
AMERICAN BRIDGE

USS AmBridge Highway Beam Guard Rail



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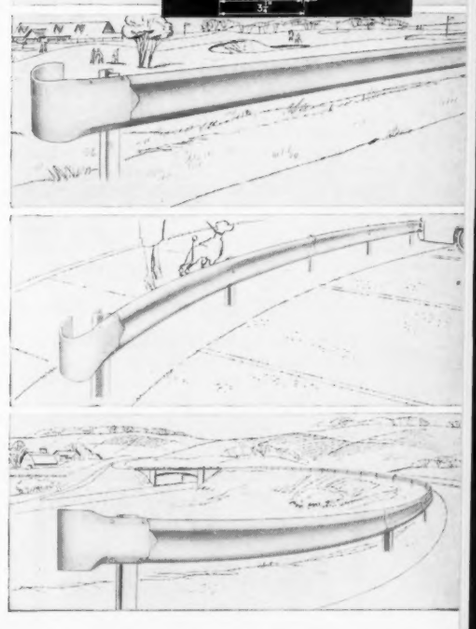

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legislative restraint upon other business pursuits where fraud may be practiced. The opinion quotes a historical account of the antiquity of tile construction and laying.

Federal wage law applied

THE PROBLEM: *The Lake Pontchartrain Causeway is a link in existing and prospective interstate highways. (1) Were employees of a contractor constructing the project engaged in interstate commerce within the federal fair labor standards act, and so entitled to overtime pay under that law? (2) Were employees, engaged in producing materials used in the construction and in the erection of a field plant for the production of materials, likewise covered by the law?*

THE ANSWERS: Yes. (Archer v. Brown & Root, Inc., 241 Fed. 2d 663, decided by the United States Court of Appeals, Fifth Circuit.)

The court said that the workers producing materials must be regarded as being engaged in "producing goods for commerce," and the workers on the field plant construction as being "engaged in commerce or production of goods for commerce."

Contractor not bound to shore adjacent land

THE PROBLEM: *Plans for a heavy building called for foundation excavation from 16 to 20 feet below street level. This bounded the foundations of adjacent buildings which were not more than 3 or 4 feet below ground level. Despite the contractor's warning, the adjoining property owners did not take adequate steps to protect their buildings. To protect his work and workmen, the contractor underpinned the buildings at a cost of $3,572.37. Was he entitled to hold the adjacent owners liable for that cost?*

THE ANSWER: No. (Warfel v. Vondersmith, 101 Atl. 2d 736, decided by the Pennsylvania Supreme Court.)

The court cited decisions of the appellate courts of California, Missouri, Montana, New Jersey, Illinois, and Minnesota to support this statement of the law applicable to cases of this kind:

"While . . . the excavating owner is under no duty to shore up, underpin, or otherwise protect buildings on adjoining land, and, if the adjoining owner desires such protection he must himself take the necessary measures for that purpose, such adjoining owner is not *obliged* to take such action but may, if he so chooses, allow his building to remain in the condition resulting from the work of excavation in the neighboring property. If, on the other hand, the excavating owner or his contractor deems it necessary for purposes of their own to shore up or underpin buildings on the adjoining land they may themselves perform such work but at their own expense."

Hold contract award to be irrevocable

THE PROBLEM: *Acting under the California Streets and Highways Code, a city called for bids on public work and, under a resolution adopted by the council, awarded the contract to the lowest bidder. Four days later, acting upon mistaken official information that the contractor was not licensed, the council held a special meeting, without notice to the contractor, and passed another resolution purporting to cancel the contract and award it to the second lowest bidder. Were the cancellation and second award illegal?*

THE ANSWER: Yes. (Application of City of Susanville, 285 Pac. 2d 1007, decided by the California District Court of Appeals, Third District.)

The court said that the code requires that the construction project be thoroughly planned, detailed, and exhaustive plans and specifications adopted, and that every important term and condition of the proposed contract be stated before bids are invited. This is so that bidders will know precisely what they are offering to do. The statute also requires that a formal contract be prepared and performance and payment bonds given after an award is made. The bonds cover things already stated in the plans and specifications, the bids, the notice and instructions to bidders, and in the bid forms, all of which are part of the brief formal contract.

The court referred to decisions of the United States Supreme Court and other courts as showing widespread judicial recognition that under conditions like those involved in this case, "the making of the award gives rise to a contract between the public body or agent and the successful bidder".

But the court also recognized that the contractor, who is required by statute to apply to the city authorities to rescind their illegal action, must do so before he can seek relief in the courts. This does not hold good if the statutes give the contractor a choice to apply to the city or to start court proceedings.

In this case, it was the city that applied to the courts to determine the validity of its action on the bidding. The Court of Appeals said that because of the special wording of the statute under which the city proceeded, the court could merely decide whether or not cancellation of the

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first award was illegal. It could not grant the lowest bidder's request for an order requiring the city to reinstate the first contract. But the court clearly indicated that if the city did not itself reinstate the contract, the contractor could start an appropriate suit to compel reinstatement.

Haulage contractor's status

THE PROBLEM: *A paving contractor engaged a truck owner to haul asphalt on a per-ton-per-mile charge basis, and to furnish the drivers. The contractor exercised no control over the drivers, except to direct where the material was to be loaded and unloaded. The contractor controlled one driver delivering a load of sand. While cleaning the truck of sand, preparatory to hauling more asphalt, this driver was accidentally injured. For the purpose of workmen's compensation liability, were the haulage contractor and the driver "employees" of the contractor?*

THE ANSWER: No. The truck owner was an independent contractor and the driver was his employee. (Imperial Paving Co. v. Russell, 308 Pac. 2d 278, decided by the Oklahoma Supreme Court.)

But under the Oklahoma Workmen's Compensation Law, the paving contractor was secondarily liable for the payment of compensation. The law did not require the haulage contractor, who was primarily liable, to carry compensation insurance.

Trespassing child hurt

THE PROBLEM: *A contractor knew that youngsters were playing about a partly constructed building but apparently took no steps to prevent the trespassers or to safeguard their welfare. An 11-year-old boy was injured when the rung of a homemade ladder broke. The ladder was resting upright against a door frame. Was the contractor liable?*

THE ANSWER: Yes. (Wilininski v. Belmont Builders, 142 N. E. 2d 69, decided by the Illinois Appellate Court, First District, Chicago.) The court approved an award of $2,500 damages.

"Contractor" was really the owner's "agent"

THE PROBLEM: *An owner arranged with two men, one of whom was to secure construction bids, materials, and the like. They referred to themselves as "builder" and "contractor", respectively, but in reality the "contractor" was the owner's agent. After the "contractor" had made a contract in his own name with the plaintiffs, paving contractors, to lay asphalt on the premises, he became insolvent. Could the plaintiffs hold the owner liable, on discovering that the "contractor" was his agent?*

THE ANSWER: Yes. (Turnbull v. Shelton, 286 Pac. 2d 676, decided by the Washington Supreme Court.)

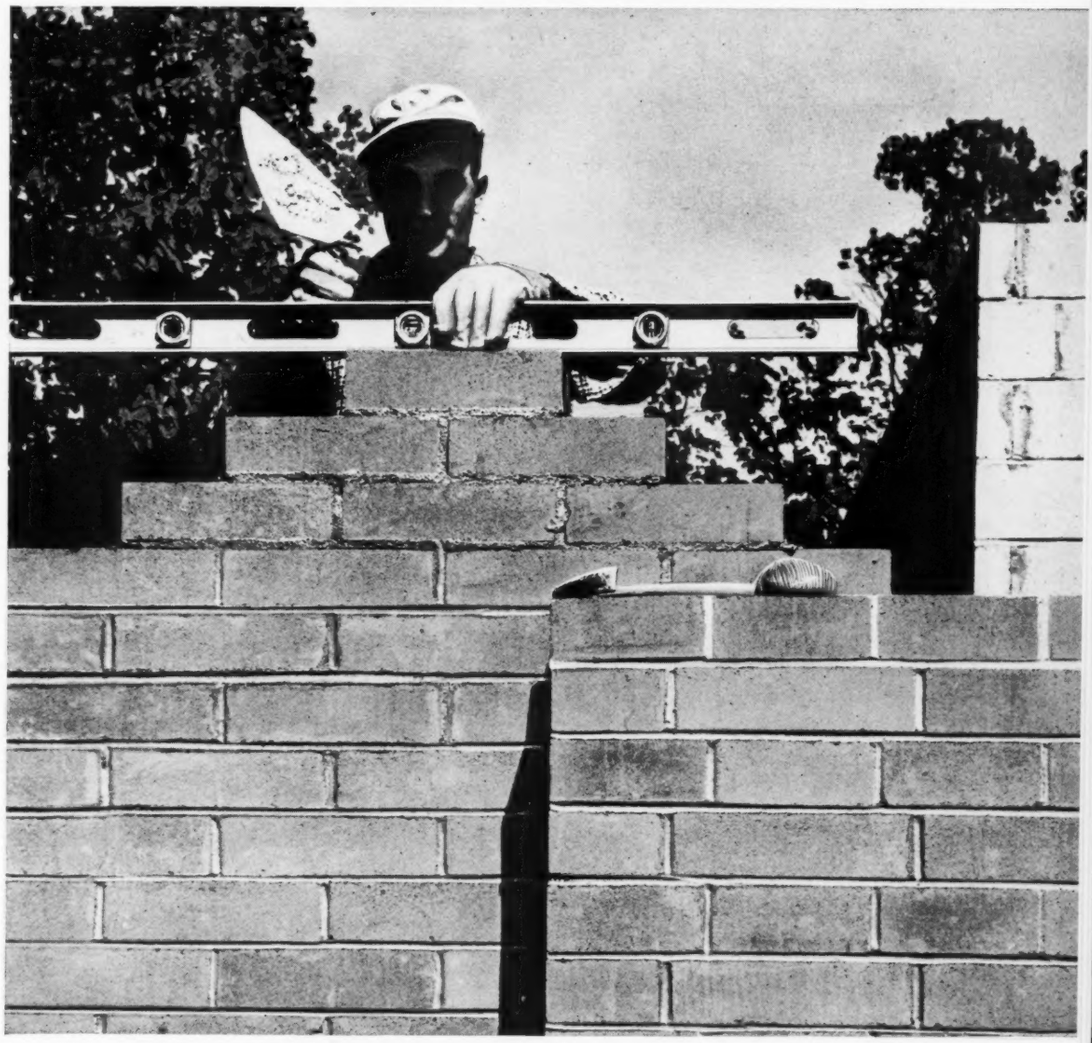
The court followed these general rules of law that are recognized by most courts:

An agency may exist in one of two ways: (1) where there is a written or oral agreement under which the parties explicitly agree upon the relationship of principal and agent; (2) where, without any such agreement, their acts and conduct indicate mutual intention that the relationship shall exist. (The law refers to this kind of agency as "implied agency".)

The court noted this difference between an "independent contractor" and an "agent": an independent contractor is not subject to control by the owner as to the details of the work, being responsible to the owner only for producing the result called for by the contract. But the agent is subject to control by the principal. In this case, the owner let the "contractor" secure bids for construction work, including the paving, but the owner decided whether the low bids should be accepted, and he was present much of the time during construction to supervise the work.

The court further said that the plaintiffs were not barred from holding the owner liable for the balance due them because they had charged the work on their books to the contractor, nor because they sent bills to him. These facts were overcome by the improbability that the plaintiffs would have looked to the contractor alone for payment, knowing that his credit was not good.

Although the plaintiffs won the case, it took two legal battles to win, one in a trial court and one in an appellate court. Obviously, litigation might have been avoided by securing the owner's signature on an order for the work, or by charging the work to, and by billing, both the owner and the contractor.



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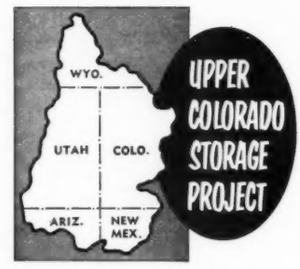
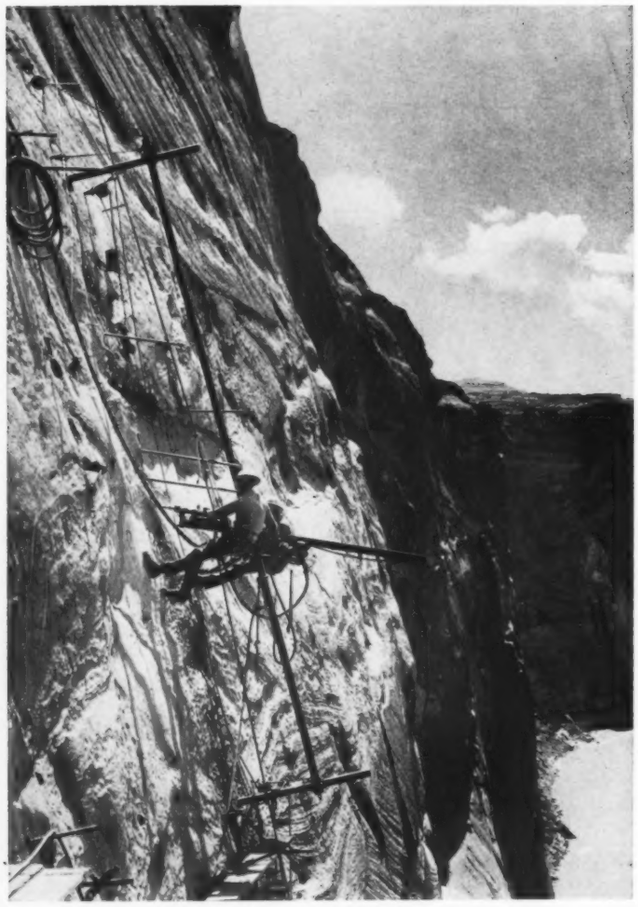
Bridge skewbacks built into vertical walls of Glen Canyon



Highest and second longest steel-arch bridge in the U. S. is begun across the Colorado just below the dam site



High above the Colorado River, W. D. Jackson and brother J. R. Jackson use a quarry-bar-mounted Thor wagon drill to sink a line of holes into sandrock for the Glen Canyon bridge skewbacks. The outline of the skewback is line drilled on 6-inch centers. Some holes went 28 feet into the rock.

A unique project allied with Glen Canyon Dam is a bridge that will be the highest and second longest steel-arch span in the country.

Spanning the canyon 865 feet downstream from the axis of the dam, the bridge is being built by a joint venture known as Kiewit-Judson Pacific Murphy, Emeryville, Calif.

The continuous steel arch will span 1,028 feet between the canyon walls, rising about 700 feet above the surface of the Colorado River. The deck will extend 1,228 feet, face to face of abutments. The arch has a rise of 165 feet from the footings, or skewbacks, which are anchored into the Navajo sandstone walls of the canyon.

Several factors played a part in this being a separate bridge, instead of one crossing the crest of the dam. First, probably, was the convenience of having a vehicular crossing of the canyon while most of the work is being done on the dam. Second, since the crest of the dam will be below the rim of the canyon, costly tunnels would have to be built as approaches to a roadway on the crest.

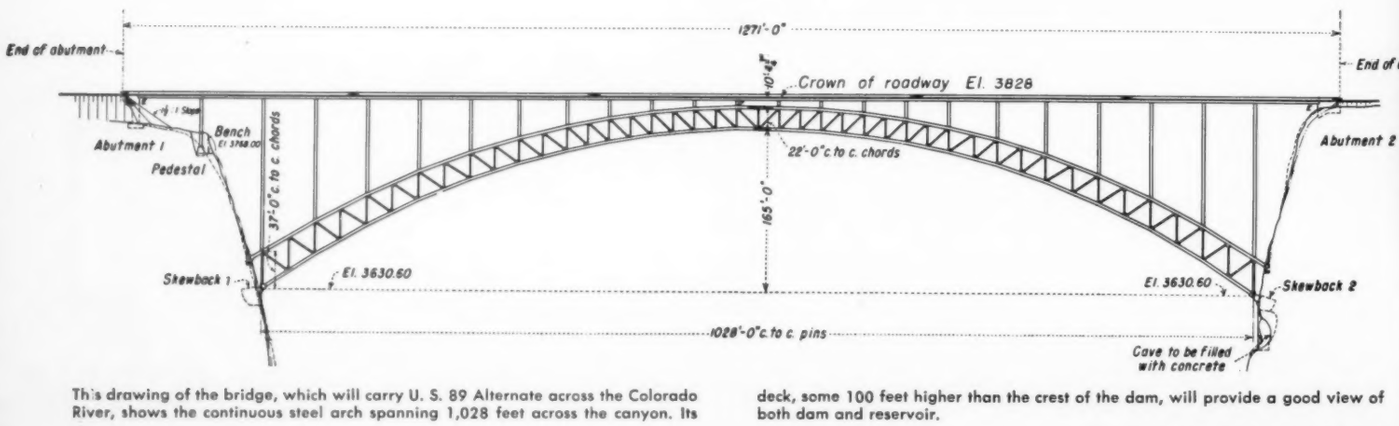
Whatever the reasons, the construction of the separate bridge just downstream from the dam and with its roadway well above the top of the dam will provide a magnificent view of the dam and reservoir, as well as being a thing of spectacular beauty itself.

The $4,139,277 bridge contract, awarded in January, 1957, was one of the first projects to get under way at the dam site. This meant real pioneering for the contractor starting the job, since a good access road and facilities at the site were completely lacking. The first job was to set up barracks and dining facilities for the crew and assemble the required manpower and equipment at the site.

Fly crews across canyon

When work got under way in March on the footing excavations, there was still no way to get across the canyon; the trip around by road is more than 200 miles. K-JPM started building a cableway across the deep gorge, but since it could not wait to start excavation on the east or far side, an airplane was pressed into service to transport workmen from the camp on one side to the work on the other side. For almost a month, the men went to work by driving from the camp to the airstrip on the west bank, flying seven miles to the airstrip on the east bank, and then driving back to the east abutment—which was only about half a mile from the camp.

The first cableway set up by the bridge contractor has a stationary tower 100 feet high on the right bank and another, 110 feet high, on the left bank. A 2-inch bridge cable, spanning the 1,500 feet between the towers, supports the carrier. It has a capacity of 12.5 tons with a 5 to 1 safety factor. Operating the cableway is an American 3-drum hoist powered by a General Motors 6-71 diesel engine with a torque converter. Although the travel speed is relatively low—250 feet per minute—the American air controls and the torque converter coupling make operation very smooth and easy.



This drawing of the bridge, which will carry U. S. 89 Alternate across the Colorado River, shows the continuous steel arch spanning 1,028 feet across the canyon. Its deck, some 100 feet higher than the crest of the dam, will provide a good view of both dam and reservoir.

Later in the year, after other contractors began work in the area, there was a heavy demand for transportation across the canyon. K-JPM entered into an agreement with Merritt-Chapman & Scott, prime contractors for the dam, to lease the cableway for the transportation of personnel, light equipment, and materials from one side to the other, and also from the canyon rims to the floor of the canyon on either side of the river.

Excavate in canyon wall

While the concrete pier and abutment were being built on the left bank and the abutment on the right bank, excavation was started on the skewbacks or arch foundations.

These excavations are located on the almost vertical faces of the canyon wall some 200 feet below the rim. Excavation was complicated by the difficult access to these spots and the fact that there was no tolerance. The holes had to be cut out of the sandstone canyon walls to exact shape without disturbing the adjacent rock.

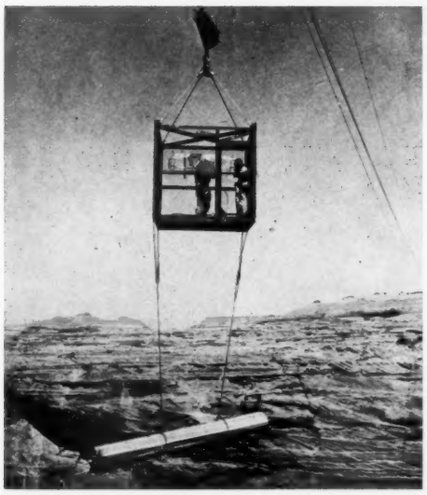
These excavations were started by high scalers, lowered over the rim in bosun's chairs. Using jackhammers, they drilled into the walls to set pins that would support scaffolding and equipment. A quarry bar was then lowered down the canyon wall and anchored in place where a line of holes was to be drilled. A wagon drill was mounted on the quarry bar to do the actual drilling.

The outlines of the skewbacks were carefully line drilled at 6-inch centers with 2⅝-inch bits. Some of these holes were drilled as much as 28 feet into the sandstone.

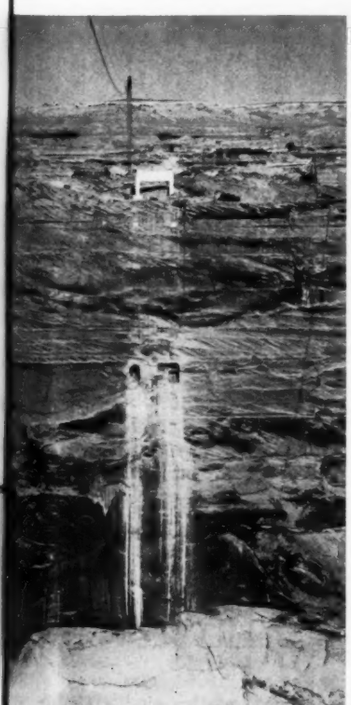
While the specifications called for line drilling and broaching to avoid damage to the adjacent rock, the contractor found that with careful drilling and the use of light charges of a slow blasting powder, most of the broaching could be eliminated. Carefully controlled blasting with Gold Medal Paratol C, an 18 per cent dynamite, made it possible for the left skewback excavation to be successfully completed by the end of September. The concrete footing has now been placed.

When excavation was started for the right skewback, the contractor found a cleavage plane in the rock, making it unfit for foundation. This meant that a large amount of rock had to be removed to reach good foundation, and the design of the

(*Continued on next page*)



A carrier of 12.5 tons capacity carries both men and lumber for bridge abutment forms across the canyon. This cableway, on 100 and 110-foot towers spaced 1,500 feet apart, provided the first means of carrying men and equipment across the gorge.



Against the sheer vertical walls of the canyon is the concrete pier for the east approach span; the two skewback holes for the ends of the continuous steel arch are plainly visible. The cableway provides the only access to the skewback area.

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Operation of the cableway providing access to the opposite rim of the canyon is handled by an American 3-drum hoist powered by a GM 6-71 engine with torque converter. Air-powered controls provide smooth and easy operation of the cableway.

(*Continued from preceding page*)

skewback had to be completely changed to fit the new location.

While engineers of the Bureau of Reclamation were redesigning this skewback the K-JPM crews removed some 4,000 cubic yards of rock to expose a new sound face. The redesigned skewback, now being built, will be ready for the start of steel erection early in 1958.

Cableway erects steel

The structural steel members of the bridge, being fabricated at the Judson Pacific Murphy plant in Emeryville, Calif., are being shipped by rail to Flagstaff, Ariz., then trucked to Page on the east or left bank of Glen Canyon.

A second cableway has been set up over the center line of the bridge by K-JPM for steel erection. This highline, with a capacity of 25 tons, is carried on towers 150 feet high at the right bank and 165 feet high on the left bank. Its main track cable is a 3-inch Roebling lock-strand cable with a span of 1,540 feet. Powered by a Lidgerwood hoist, the cableway will operate at a usual speed of 350 fpm.

This second cableway will be used exclusively to handle the 3,500 tons of structural steel in the bridge. The original cableway will still serve to move workmen and supplies and to service the erection operation. This is thought to be one of the first continuous steel-arch bridges ever erected by cableway.

In addition to the two cableways, the contractor is setting up a 100-foot-high tower on each side of the canyon so that pendants can be strung out to the panel points of the bridge to support the arch while it is being erected. These towers will be guyed back to support the load and will have as many as 40 tieback or pendant cables that will be advanced from one panel point to another as the arch erection progresses. Each of these tiebacks will be tensioned with a calibrated hydraulic jack to maintain the steel in perfect position during the assembly operation.

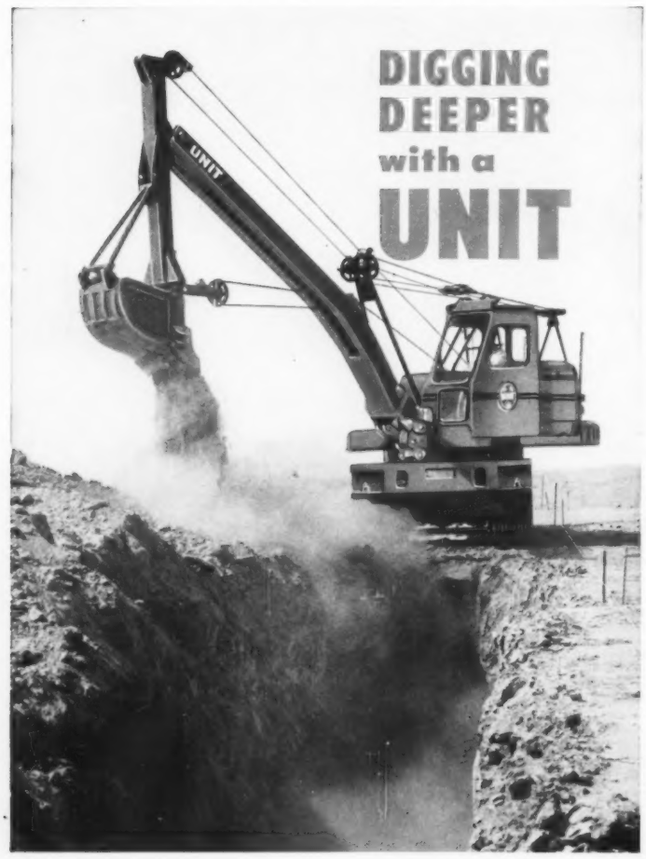
When the steel has been erected, a concrete deck will be cast in place. It will be 40 feet wide, with two 16-foot travel lanes, two 4-foot sidewalks, and steel railings. The deck will taper from 6 to 7½ inches in thickness. The bridge is scheduled for completion early in 1959.

Build temporary footbridge

To provide access across the canyon for the many workmen on its operation, prime contractor Merritt-Chapman & Scott decided to build a temporary footbridge to serve until the highway bridge is complete. The furnishing, fabrication, and erection of the structure were subcontracted to the Kiewit-Judson Pacific Murphy combine.

The footbridge is a 1,280-foot suspension bridge carried on six Roebling 1¾-inch galvanized bridge strands. These pass over towers on the banks of the canyon and are anchored in big concrete blocks cast into the sandstone.

The main suspension cables are placed in two groups of three cables each. Suspender cables ⅝ inches in diameter support the floor system at 20-foot intervals. The floor is an open wire mesh clamped over eight 1-inch round galvanized bridge cables. Other cables tie the bridge down to anchors



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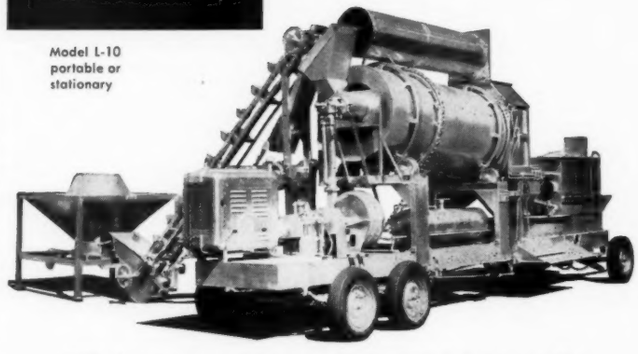

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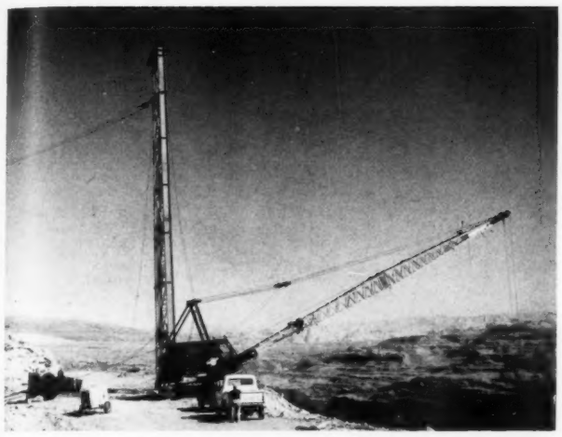

The combine building the bridge, Kiewit-Judson Pacific Murphy, holds a subcontract for a 1,280-foot-long suspension footbridge across the gorge for crews of Merritt-Chapman & Scott Corp. working on the dam. The Manitowoc is supporting a skip over the edge which is being used by workmen setting anchors in the canyon wall for wind-bracing cables.

on the canyon wall to provide tiedown and wind bracing.

In erecting this bridge, the contractor first dropped two 5/8-inch haul lines over the canyon wall, took them across the river by boat, and pulled them back up the opposite side of the canyon. These were spliced together to make a continuous haul line. A 7/8-inch messenger cable was next strung across with main cable carriers attached at 150-foot intervals. This served to carry the main cables and deck cables across.

The machine which actually pulled all the cables was an American hoist powered by a General Motors 6-71 diesel engine. The hoist was able to exert a line pull of 16,000 pounds.

Subcontract other steel work

K-JPM, which subcontracted a great deal of the steel work from M-C&S on the entire project, will furnish and erect the four big moving towers for the two cableways placing concrete for the dam. It will also furnish and erect the structural steel in the powerhouse. In addition, Judson Pacific Murphy will furnish and place the reinforcing steel in the big dam.

Personnel

The project superintendent on the work for the Kiewit-Judson Pacific Murphy joint venture is W. A. "Bill" Choate. On his supervisory staff are general foreman Jim McKrown, excavation foreman Paul Judd, carpenter foreman Lonie Ritchie, rigging foreman Chester Roller, erection foreman Jack Pierce, and field office manager Lawrence P. McGarry.

THE END

Ogden acquires Eimco and American Foundry

Ogden Corporation, industrial investment corporation of New York, N. Y., has acquired The Eimco Corp., manufacturer of highway construction, mining and filtration equipment, and the American Foundry & Machine Co., producer of gray iron and steel castings. Both firms are of Salt Lake City, Utah.

"Buy-Back" plan for Koehring equipment

Under a new "Buy-Back" plan, intended to increase the availability of bank credit for contractors and other customers, Koehring Co., Milwaukee, Wis., will underwrite credit arrangements negotiated between the equipment buyer and his bank.

A descending scale of values has been set up under which Koehring will repurchase the equipment if the buyer defaults in his payments to the bank. In general the schedule of "buy-back" prices, except in the early months, would exceed the unpaid balance due on the installment credit. However, the repurchase price would be limited to the unpaid principal, plus accrued interest.

The plan works either for sales through distributors or sales made directly to customers. It will also work in cases where Koehring distributors handle their own financing. Also, where distributors deliver equipment on a straight lease or rental purchase plan, Koehring may underwrite the financial arrangements.

All Koehring divisions and subsidiaries are covered by the plan. These include: Buffalo-Springfield, Springfield, Ohio; Hydraulic Press Mfg., Mount Gilead, Ohio; C. S. Johnson, Champaign, Ill.; Koehring, Milwaukee, Wis.; Koehring California, Stockton, Calif; Koehring-Waterous, Brantford, Ont., Canada; Kwik-Mix, Port Washington, Wis.; and Parsons, Newton, Iowa.

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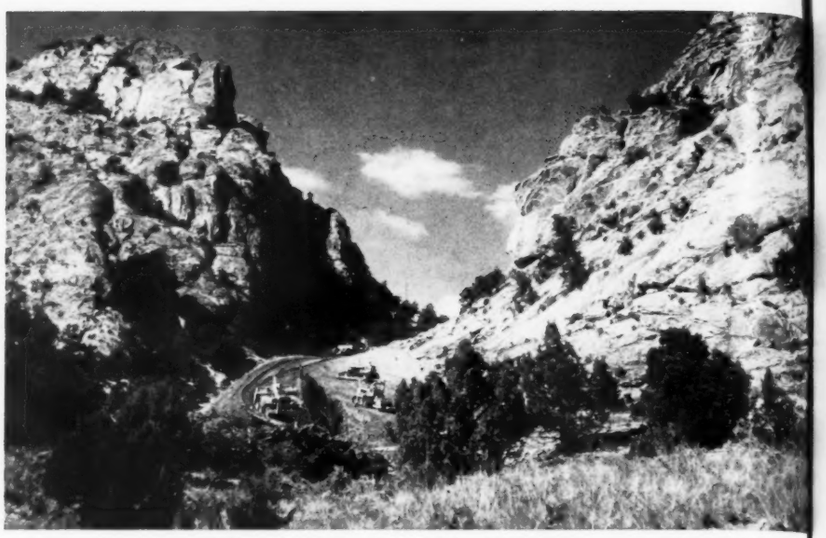
In the wilderness near Flaming Gorge, a lone Cat D8 works its way up a steep bank to pioneer a new cut for an access road to the townsite. The 7.9-mile stretch being built this year continues the access road into the town.



Scrapers had tough going on the low side of the gap, where the embankment is being built up to a maximum height of 70 feet. The Cat DW20 is unloading as it comes down the 25 per cent grade, while a D6 compacts the embankment with a sheepsfoot roller.

The toughest part of the grading done by Wangsgaard Construction Co., Logan, is in Dutch John Gap. Huge boulders in the gap were drilled, blasted, and the pieces removed before scrapers could work. The DW20 and Cat 456 scraper are being push-loaded by a Cat D8 tractor-dozer with Ateco ripper.

Access road, townsite work

Anticipating a rush of construction work when the prime contract for Flaming Gorge Dam is awarded in the spring, several contractors have been busy all fall—and some are working through the winter—on the access road and town facilities near the dam site in northeastern Utah.

Flaming Gorge dam site (no other name has yet been adopted) is in a high, grassy mountain valley known as Dutch John Flat. It is about a mile as the crow flies from the actual dam site, but the access road which will lead to the left abutment will be at least two miles long.

This is a remote area. The grassy valley is reported to have been the wintering grounds for herds of deer that summer in the surrounding mountains, and until recently, the area was seldom seen by anyone except an occasional hunter or sheepherder. The nearly vertical rocky ridges that characterize the area make travel of any kind extremely hazardous and difficult. But a few years ago, a pipeline contractor proved that the area could be traversed by construction machinery when he slashed through the wilderness, laying a 26-inch natural gas pipeline from the four-corner area in Colorado to the Canadian border for the Pacific Northwest Pipeline Co.

In one year, this valley, ringed by wooded mountains and precipitous cliffs, will be transformed into a mod-

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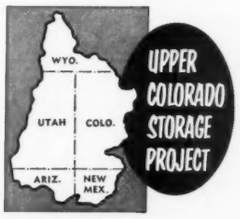
Placing fill, watering, and compacting are done simultaneously on the low side of the gap by the DW20, a GMC 4×6 truck with a 2,000-gallon water tank, and two sheepsfoot rollers.

At the townsite itself, where grading subcontractor Whiting & Haymond is at work, fast loading cycles are the rule. Double push-loading the Euclid S-18 are a Cat D8 and International TD-24.

Access-road grading is pushed through rough terrain; streets, utilities, homes springing up for new town



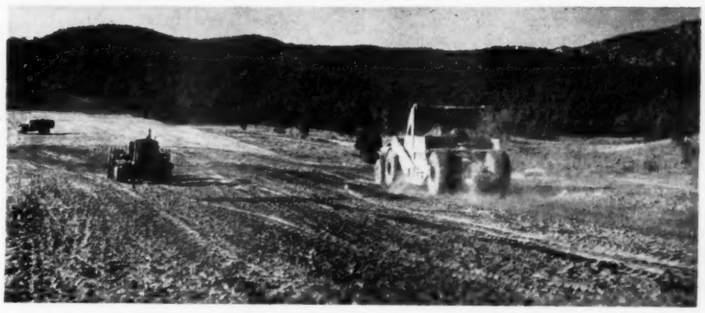
...work open Flaming Gorge project

ern American city. The normal population of Daggett County is less than 500 people; there may be ten times that number at the Flaming Gorge townsite during the peak of construction. It will probably house more than 1,500 workmen and their families, and perhaps half that many will make it a permanent home. The nearest settlement, Linwood, Utah, (two houses and a post office) is about 20 miles away on the opposite side of the Green River.

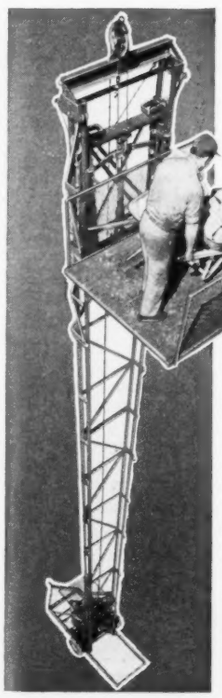
Temporary access road

Construction of an access road from Linwood to the townsite opened the area last year. A 7.5-mile stretch of

(Continued on next page)



Most of the excavation goes into one big fill where the access road leads down from a rise to the townsite. On this 250,000-cubic-yard fill, a DW20 scraper unloads at high speed, spreading the earth in a thin lift. The water truck and sheepsfoot rollers work constantly on the fill.



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Rock excavation is concentrated in a 15,000-cubic-yard cut on the access road at the edge of the site. Preparing to shoot with one blast, crews sink 22-foot-deep holes on 6-foot centers with a Gardner-Denver Wagon drill, powered by a G-D 500-cfm compressor.

graded road, with a timber trestle across the Green River, was pushed through last winter by Wangsgaard Construction Co., Logan, Utah, and USBR crews dozed out some ten or more miles of trail to the hills to provide temporary access to the site.

This year, under a $505,000 contract, Wangsgaard is grading another 7.9 miles to continue the graded road into the town. This involves moving 366,000 cubic yards of unclassified excavation (about a fourth of it rock) and placing 26,500 tons of gravel surfacing. A 1½-inch-thick road-mixed bituminous surface will be placed in the spring. On this job, Jack Daugherty is superintendent for Wangsgaard, and the chief inspector for the USBR is Earl Goodrich.

This is still only a temporary road, to serve the project site during construction. Once the dam is complete water will back up in the reservoir and inundate portions of the road to depths as great as 190 feet. But before that time, the permanent access road will be graded through about seven miles of extremely rough country between the right abutment of the dam and Utah highway 44.

Grade through Dutch John Gap

The toughest part of Wangsgaard's second contract was pushing the grade through a spot known as Dutch John Gap. Here the alignment uses a deep natural gap in a high rock ridge. The floor of the gap, however, was a maze of huge boulders, (from the size of a house on down) which had fallen in from the sides over the centuries.

When the contractor first started work here, it was impossible to walk through the gap; it could only be traversed by climbing over some boulders and crawling on hands and knees under others.

To open the pass for other equipment, a crew moved in with a 105-cfm compressor, a jackhammer, and a Caterpillar D8 tractor. The big boulders were drilled and shot, and the chunks dozed into areas where they could later be covered by fill. Finally, a roadway was pioneered through the gap for tractors.

On the low side of the gap, the plans called for a fill as high as 70 feet, with material coming from a deep cut on the opposite side of the gap. The extremely steep grade through the gap could barely be navigated by crawler tractors and scrapers when the work started, but as material was carried through the gap and the level on the lower side built up, the grade became less steep.

The first haul units to work through the gap were a pair of Caterpillar D8 tractors, one pulling a Cat 80 scraper and the other a LeTourneau FP scraper. When the grade through the gap had been reduced to about 25 per cent, two Caterpillar DW20 tractors with Cat 456 scrapers arrived on the job. The rubber-tire rigs easily carried the dirt down the grade, dragging the scrapers to brake. But even empty, they had all they could do to make the uphill grade. In fact, one Caterpillar D6 tractor-dozer spent quite a bit of time helping the scrapers back up the hill.

Two Cat D8 tractor-dozers took turns push-loading the scrapers, and pioneering the cuts and ripping rock. One of them, a 14A model, was equipped with an Ateco ripper. There were also two International TD-24 tractor-dozers on the grading and a second Cat D6 with sheepsfoot roller on the fills.

During the later stages of the work two Caterpillar DW21 scrapers and a Cat D9 tractor-dozer with Ateco ripper joined the spread. A Caterpillar No. 12 motor grader did the finishing.

In this very dry country, obtaining water for compaction was a real problem. Most of the supply was trucked in by a 2,000 and a 4,000-gallon tank truck from the Green River near Lin-

KOEHRING WORK CAPACITY *in action* . . .

Pre-cast concrete bents, weighing 9 to 14 tons, had to be erected on construction of a new school. Above photo shows how the contractor got the job done with a Koehring 305 truck crane. It has a top lifting capacity of 25 tons, and boom lengths from 30 to 100 feet, plus 15 to 30 feet of jib — handles maximum 130-foot boom and jib with low A-frame. Butt-connected crane boom is safe, solid. Inserts are easily changed — only 2 bolts per corner.

Sewer installation — 3 miles of 8-inch pipe, 5 miles of 6-inch pipe, and 6 miles of 4-inch pipe were layed in a hurry, with the help of this Koehring ½-yard hoe. Edging along the curb, pole-line, trees, it cut trench through black-top pavement and set pipe in place at a rate of 800 feet per day. The heavy-duty 205 hoe has a maximum digging depth of 17¾ feet — and widths up to 31 inches over side-cutters.

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.

While street grading is under way, trenching for the town's sewer system goes on. The Bucyrus-Erie 22-B backhoe handles the excavation job for the joint venture of Evan W. Ashby and Leo B. Stewart, of Salt Lake City.

wood. This meant a minimum haul of about seven miles, increasing as the work advanced toward the townsite. A 3-inch pump at the river filled the tanks.

After the road had been carried through Dutch John Gap, water for grading was hauled back from the supply developed at the townsite by the townsite grading contractor.

Where rock was encountered, it was drilled with an Ingersoll-Rand wagon drill powered by a Chicago Pneumatic 315-cfm compressor, and shot with dynamite. The scrapers loaded and hauled the rock with the help of the rippers and pushers.

Crushed gravel surfacing was produced from a pit beside the right-of-way. A Caterpillar D8 tractor-dozer fed the material to a Cedarapids two-stage crushing-screening plant. The rubber-tire scrapers delivered the material to the roadway to be spread by the motor grader.

The contract is scheduled for completion by June 25, but Wangsgaard expects to have the surfacing substantially completed this winter, leaving only the oiling to be done next spring.

Grading first townsite job

The first big contract at the townsite—for roads, streets, utilities, and 80 homes—went to Witt Construction Co., Provo, Utah, on a bid of $2,678,-031. Witt promptly sublet the earthwork to Whiting & Haymond of Provo, which lost no time in getting the work under way. In fact, crews under superintendent Grant E. Palfreyman worked for the best part of a month and had a good part of the grading complete before the notice to proceed was issued. Bids for the work were taken on June 4, and the contract was awarded July 25, but the notice to proceed was not issued to the contractor until August 24.

Site and street grading required about 300,000 cubic yards of unclassified excavation, about 15,000 cubic yards of it rock. A large part of it went into a single big fill on the access road leading down off the last ridge into the town area. The 250,000 cubic yards in this fill had to be watered and compacted as it was placed, and the contractor pushed this part of the

As the sewer pipe is laid, one man shovels earth over the pipe and another tamps it with an Ingersoll-Rand air tamper. At right is the Aeroil Heet-Master for heating the sealing compound used at the joints of the line.

work to get it done before the weather got too cold. The rest of the excavation, which is being wasted, is being finished during the winter.

The one big fill, 30 feet high over much of its length, is built over three separate Armco Multi-Plate culverts that carry the drainage. Two of these are 84 inches in diameter and 152 feet long. The third is a 72-inch-diameter culvert, 172 feet long. The three big pipes were assembled, placed, and covered in a week.

Water is big problem

Obtaining the 4.2 million gallons of water required for compaction, as well as water for other purposes, was the grading contractor's biggest prob-

45-ton roustabout — installing heavy machinery in the oil field, the new 445 truck crane (right) shows off its muscles. Heaviest load was a 23-ton mud pump — an easy lift for the big Koehring 445! It can pick up 45 tons with 40-foot boom at 15-foot radius. On high-lift work, it handles up to 120 feet of main boom, and 15 to 30-foot jib. Top travel speed on this mobile, heavy-lift crane is 31.8 mph.

A new 2-yard — Another size has been added to the Koehring *"work capacity"* team — a heavy-duty 2-yard, with 25-foot deep-section shovel boom, and 18½-foot twin dipper sticks. You'll like the 805's power, strength, and stability in heavy digging — and *extra capacity* as a clamshell, dragline, or crane (see lift rating chart below). Want to know more about it? Call Koehring distributor *right now.*

Look at the reach of the high-lift crane (below), starting construction on a new thruway. Boom lengths on this big Koehring 1205 range from 60 to 170 feet — and that's not all! When extra reach is needed, it handles up to *190 feet* of boom and jib. 90% power-assist on main-drum clutches gives operator light lever-pull and sensitive "feel" of load for precision lift work at every boom length.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-ft. radius
205 ON RUBBER	½-Yd.	30,000 lbs. 14,600 lbs.	at 12-ft. radius at 20-ft. radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15 ft. radius at 25-ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? See Koehring distributor.

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(*Continued from preceding page*)

Backfilling around the sewer pipe is completed by an Allis-Chalmers HD-5 Tracto-Shovel. The tamping crew works just ahead in the trench, and air for the tamper is supplied by the Chicago Pneumatic 210 compressor at right.

lem. At first, holding ponds were dug at several springs in the vicinity, and these, together with some water trucked 20 miles from the Green River, provided enough water to keep the work going until a better supply could be produced. Harold J. Whiting, one of the owners, was on the site giving his personal supervision to all the work, but water production came in for his special attention.

To develop the larger supply, W&H installed a Byron Jackson 4-inch centrifugal pickup pump in the Green River and laid some five miles of 5 and 6-inch aluminum pipe to bring the water to the edge of the townsite. This was the closest point at which access to the river could be obtained. Even here, the access road was so rugged that it could be traveled only by tractors and four-wheel-drive jeeps.

The Byron Jackson pump, powered by a Chrysler 8-cylinder industrial engine, raised the water 350 feet vertically from the river to a Berkeley centrifugal booster pump powered by a Ford industrial engine. The booster pump, set right in the line, raised the water another 275 feet to a pond with a capacity of about 200,000 gallons. This pond was located at one of the largest springs, and water from several smaller springs nearby was piped into the pond to augment the supply.

From this pond, a second Berkeley pump mounted on the front of an International ID-9 tractor raised the water another 275 feet to the final storage pond. This pond, with a capacity of 500,000 gallons, is located on a ridge about half a mile from the building area and some 75 feet above it.

A gravity line of aluminum pipe leads from this tank to a double standpipe on the edge of the townsite where the water trucks are filled by gravity. This water supplied Whiting & Haymond's needs on the big fill, Witt's ready-mix concrete plant, some of Wangsgaard needs on the access road grading, and miscellaneous needs around the site.

Try several scrapers

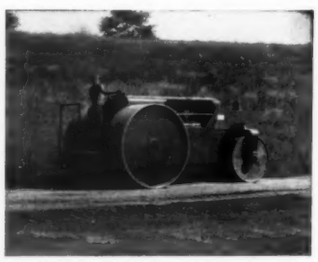
Taking advantage of the dealer's rental plans with option to purchase, the grading contractor tried three types of scrapers, all working together. These included a Euclid S-18, two Caterpillar DW20's and two International 2T-75's. All the machines got heaping loads of the dry silty clay soil with the aid of two push-tractors. A Caterpillar D8 and an International TD-24, both with torque converters, double-pushed the scrapers for high-speed loading. With the long haul, which averaged about a mile from the excavation to the big fill, the contractor considered it very important to get the scrapers well filled on each trip.

On the fill, two Caterpillar D8 tractors pulled tandem double sheepsfoot rollers to accomplish the required compaction. In each case, one of the double rollers was a LaPlant-Choate 42-inch. One of the D8's also used a Gebhard 6-foot roller. Water was supplied to the fill and haul roads by two Kenworth trucks with 3,600-gallon tanks and two International trucks carrying 2,000 and 2,500-gallon tanks. Two Caterpillar No. 12 motor graders shaped to fill as it was built up, maintained the haul road in excellent shape for the high-speed scrapers, and did the finishing on the townsite streets.

Rock excavation

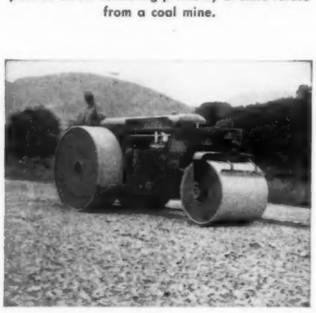
All of the rock excavation in Whiting & Haymond's contract occurred in one cut on the access road at the edge of the townsite. The entire cut was drilled on 6-foot centers by a Gardner-Denver wagon drill, powered

Buffalo-Springfield 3-Wheel Roller on a widening and bituminous resurfacing job.



This 3-Wheel Buffalo-Springfield Roller is compacting earth fill for new pavement.

Buffalo-Springfield 3-Wheel Rollers speed compaction on fill consisting primarily of slate refuse from a coal mine.



Here a Buffalo-Springfield 3-Wheel Roller compacts crushed stone base for new highway.

To compact largest *variety* of material, use Buffalo-Springfield's 3-Wheel Roller

Buffalo-Springfield Heavy-Duty 3-Wheel Rollers are long-time favorites for handling the wide variety of materials found in fills, subgrades and bituminous pavements. Variable weights in 10-14 and 12-15 ton sizes, power roll brakes, tapered roller bearings on *all* rolls . . . assure widest range of use, unequaled safety, maximum maneuverability, smoothest performance and longest operating life.

The Buffalo-Springfield 3-Wheeler's time-proven 4-speed transmission is an unmatched assembly built for outstanding performance and durability under severe load conditions. Torque converter drive with 2-range transmission is also available as optional equipment.

When *one* roller must do *many* jobs, the Buffalo-Springfield 3-Wheel Roller is your best buy. Ask your nearest Buffalo-Springfield distributor today for all the reasons *why* Buffalo-Springfield 3-Wheel Rollers are top choice for multi-purpose compaction regardless of the type of material to be compacted.

Write today for a copy of the new 3-Wheel Roller Bulletin, S-72-156.

BUFFALO-SPRINGFIELD ROLLER CO.
DIVISION OF KOEHRING COMPANY · SPRINGFIELD, OHIO

For more facts, use Request Card at page 18 and circle No. 252

by a Gardner-Denver 500-cfm compressor and using Timken 3-inch carbide-insert bits. The holes were loaded with 80 per cent prilled ammonium nitrate and 20 per cent dynamite. The entire cut was shot at once and the blasted material was loaded and hauled to the nearby fill by the scrapers.

The source of aggregates was indicated on the plans at a point about seven miles from the townsite. But Whiting & Haymond did some scouting and located a source near the site which was approved by the Bureau for street-surfacing aggregate.

Into this pit the contractor moved a crushing setup consisting of a Cedarapids 24×36 primary jaw crusher and a Pioneer Model 46 two-stage secondary plant. Two Caterpillar D8 tractor-dozers feed the plant and the finished material is trucked to the streets and roads. For this hauling operation, two big Fruehauf 30-ton bottom-dump trailers are used with the Kenworth trucks. Seven International ten-wheelers with 10-yard dump boxes are also used.

The contractor is attempting to get the 42,000 tons of surfacing aggregate placed on the graded streets this winter so that the area will not be too muddy in the spring. The streets are being surfaced with 4 to 6 inches of gravel now. A leveling course and 2-inch-thick road-mixed bituminous mat will be placed in the spring.

Whiting & Haymond set up their own camp on the site when they started grading. About 26 men boarded at the mess hall and lived in the portable bunkhouses; several families lived in their own trailers. An International U4 engine and 10-kw generator supplied electricity for camp lighting, and a number of portable generator sets powered lights for the work area during several weeks when the work was run on two 9-hour shifts.

Underground utilities

By early September, enough of the streets had been graded to permit the start of underground utility work. The construction of the sanitary sewer system and the water distribution system was sublet to a joint venture of Evan W. Ashby and Leo B. Stewart of Salt Lake City, and the two contractors are right on the job supervising the work.

To excavate the trench for the 26,000 linear feet of sewer and about 22,000 linear feet of water main, these contractors are using Bucyrus-Erie 22-B and 20-B backhoes and a Buckeye trencher. Some of this digging is in a strata of semi-hard sandstone which resists the attack of the hoes.

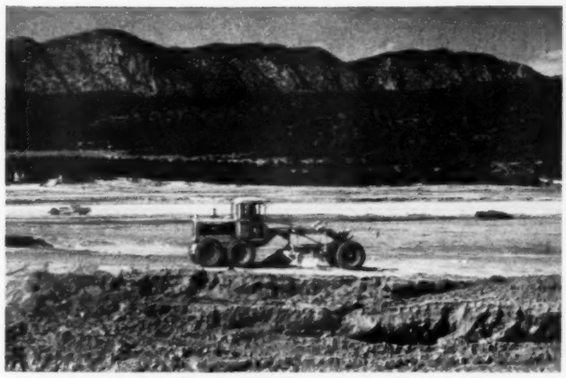
The clay sewer pipe, in sizes from 4 to 10 inches, is joined with Husky 850 poured joint material which is heated in an Aeroil Heet-Master kettle. Backfill around the pipes is placed by hand and thoroughly compacted with air tampers powered by a Chicago Pneumatic 210-cfm compressor. The balance of the backfill is then placed by an Allis-Chalmers HD-5 Tracto-Shovel and a Caterpillar D4 Traxcavator.

The 4 and 8-inch cast-iron water main is laid in a similar manner, but the pipe joints are sealed with rubber gaskets. These rubber gaskets, used with the bell and spigot pipe, greatly speed the laying of the pipe.

An exploratory water well for the community is being drilled by J. S. Lee & Sons of Salt Lake City under a prime contract with the Bureau of Reclamation. If a satisfactory source of water is developed, a contract will be awarded for the pumping and storage facilities. If not, a surface water source will be developed.

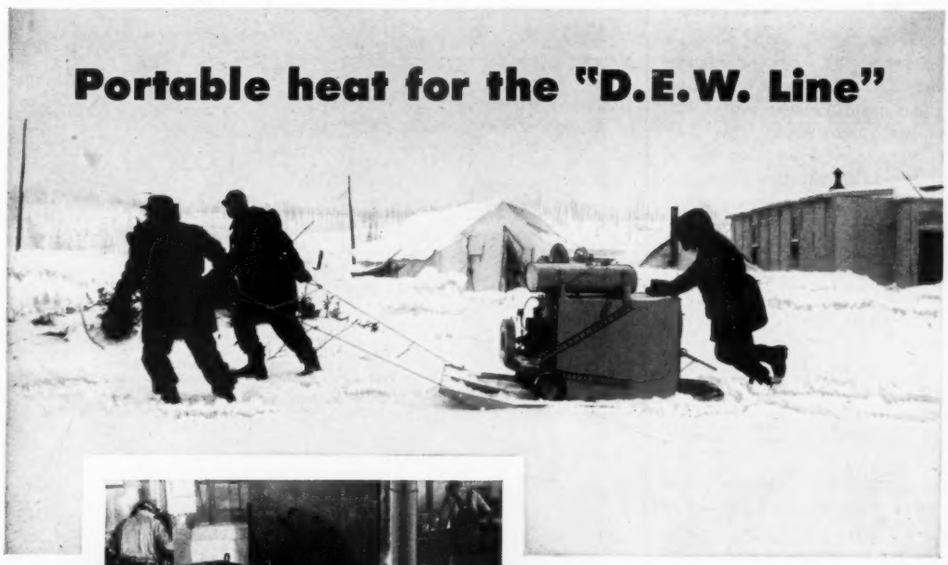
Sewage from the town will be treated in a plant which will be built by Witt Construction Co. The treated

(*Continued on next page*)



At the townsite on Dutch John Flat, a Caterpillar No. 12 motor grader brings one of the streets to grade. The contractor is working through the winter, getting the 42,000 tons of surfacing aggregate onto the graded streets.

Portable heat for the "D.E.W. Line"



. . . or temporary heat in a machine shop

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Only the *best* in portable heaters will do for the "D.E.W. Line"—and they're Herman Nelson! For *your* winter jobs in road-building or home-building—plant maintenance, plumbing or plastering—get your portable heat from a Herman Nelson. No other portable heater gives you such safety and dependability . . . engineered for long service with minimum repairs. Many contractors and builders find Herman Nelson Portable Heaters pay for themselves the first winter. You can buy or rent a Herman Nelson for any job need. See your dealer now!

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(Continued from preceding page)

effluent will be discharged into stabilization ponds.

Build 80 houses

Witt's contract calls for the construction of 80 two and three-bedroom houses of conventional frame or masonry veneer construction with floor areas of approximately 1,200 square feet. The site grading had progressed sufficiently by mid-September so that the concrete footings and block foundations could be started.

To produce the concrete for this and other uses around the site, Witt set up a batch plant and brought in two transit mixers to mix and deliver the concrete. The plant consists of a set of Winslow three-compartment 75-ton bins fitted with a batcher, together with a 130-barrel cement plant.

About October 1, Witt moved a complete crew to the site under superintendent A. J. Chapman and set up a trailer camp together with a kitchen and dining room. This crew went right to work and expected to have 20 to 25 of the homes roofed and enclosed by the time winter weather became severe. The work is continuing during the winter—outside when weather permits and inside on inclement days.

Another item of work under Witt's contract is the furnishing and erection of 10,700 feet of 6-foot-high wire fencing around the townsite and an additional 450 feet of 7-foot-high fence around the sewage treatment facilities.

During September, Bureau forces set up 25 Transa-Homes furnished by Transa-Homes, Fullerton, Calif. These unique structures fold up for highway transport, but can be quickly expanded to make comfortable four-room houses. They are being used by USBR field forces during the construction period.

Construction of the electrical distribution system for the town was sublet by Witt to Cache Valley Electric Co., Logan, Utah. A number of smaller contracts have been awarded for the construction of offices, warehouses, garages, laboratory, shops, fire station, and other facilities.

The four-classroom school at the Flaming Gorge townsite will be built by Hogan & Tingey, Salt Lake City, under a $108,655 contract awarded by the Daggett County, Utah, school board. It will be ready for the fall term next year.

The Bureau of Reclamation staff, headed by project construction engineer Jean Walton, includes field engineer Roscoe Granger, office engineer Wesley Behling, chief inspector George Angelovic, chief of surveys Herbert Senne, materials engineer William Groseclose, and geologist George Wongwai. THE END

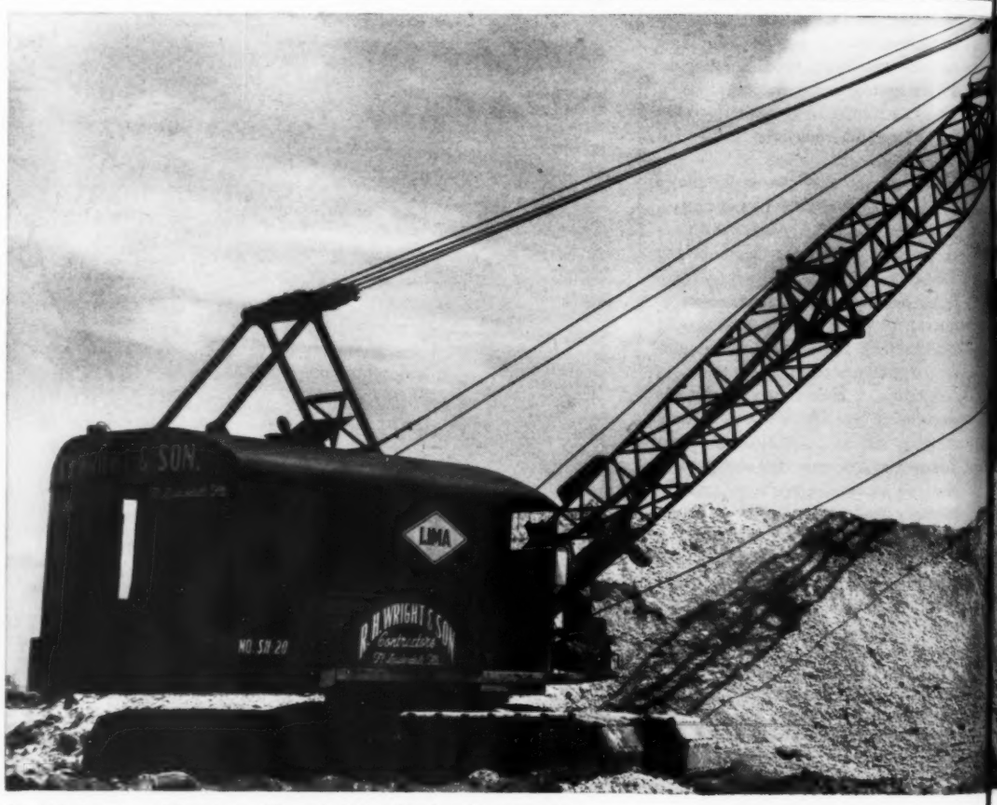
One goal of the Pennsylvania Department of Highways is at least one roadside rest area in each of the 67 counties by the end of summer. The amount that can be spent on each has been increased from $5,500 to $8,000.

A pumping and pipeline setup with a vertical lift of 900 feet brings water five miles from the Green River to the site for compaction, dust control, and other work. The high-pressure pump mounted on the International ID-9 tractor will pump water from this 200,000-gallon intermediate pond, to a 500,000-gallon pond on a rise at the site, where trucks will be fed by gravity. Meanwhile, the Rex pump, left, fills trucks at this pond.

IRF sponsors studies of foreign engineers

Forty-four of the world's foremost highway engineers from 34 countries are studying in American and British universities this year under the sponsorship of the International Road Federation. Of this number, 42 are studying in the United States, and two in Durham University, Great Britain.

All the engineers are officials of their respective governments and are enrolled in graduate engineering schools. For the first time since the IRF fellowship program was initiated in 1949, the group includes one female highway engineer—Miss Ivonne Rainusso of Montevideo, Uruguay, of the Ministry of Public Works.



Stockpile for the road foundation. The material is taken from the edge of the Gulf of Mexico which parallels the project at this point on the Florida Keys.

Gulf Products and Fine Service

Left to right: Jimmy Smoak, Superintendent, R. H. Wright & Son; P. J. McConnell, Engineer, Florida State Road Commission; and L. F. Proctor, Assistant District Manager, Gulf Direct Sales, Miami.

Seventy days along on a 350-day job and 23% ahead of schedule! That's the news from the Boca Chica Naval Air Base bypass project seven miles north of Key West, Florida, on U. S. No. 1. Working at such a fast pace demands top performance and protection from fuels and lubricants to keep equipment on the go. Says Jimmy Smoak, Superintendent of Contractors R. H. Wright & Son, Fort Lauderdale, "All concerned with the job are well pleased with the performance of Gulf products and service."

Gulf can serve you too. 1500 strategically located warehouses, in 32 states, stand ready to supply you with a steady flow of quality fuels

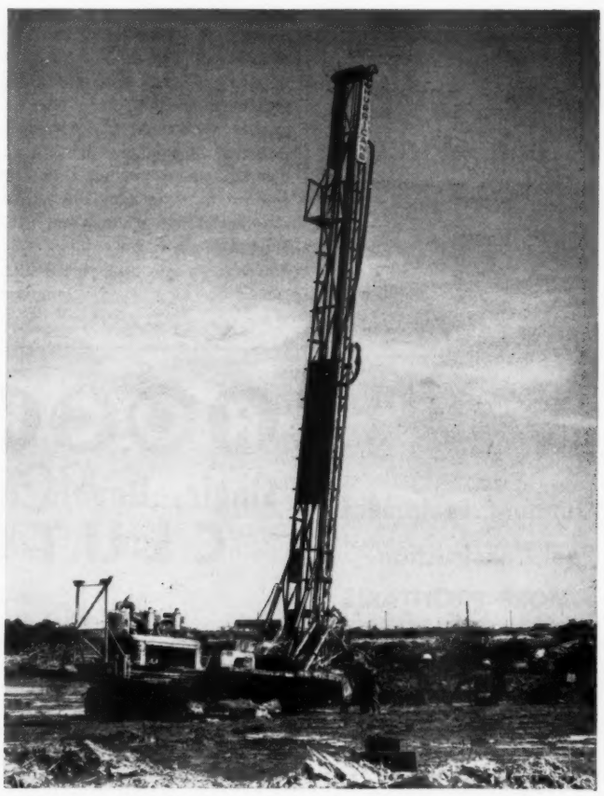
American Cyanamid opens permanent exhibit

The vital role of chemistry in industry and many other areas of American life is being dramatized by a new and permanent exhibit center in Rockefeller Center, New York City, by the American Cyanamid Co.

Located at 49 W. 49th St., the exhibit center will be open every day but Monday from 11 a.m. to 9 p.m.

Many of the displays, animated and with sound track commentaries, are designed to be operated by visitors. Dioramas and moving panels form some of the other exhibits. A map of the world, one of the largest ever made in metal, measures 97 square feet. It spots all operations of the American Cyanamid Co.

COMMERCIAL BATCHING has become an important side line for Fair Oaks Gravel Co., Fair Oaks, Calif. The firm, which did not want to compete with its customers for ready-mix business, is using a Noble semi-automatic batch plant to supply concrete batches to both ready-mix companies and contractors operating their own mixer trucks. The service keeps hauling costs low for both supplier and customer.



Mayhew Hurricane Drill, mounted on International TD-18 Tractor, sinks blasting holes to a depth of 30 feet near edge of the Gulf.

keep equipment rolling on Florida highway project

and lubricants. A Gulf Sales Engineer, backed by 1300 scientists and technicians, provides cost-free, expert advice on any problem involving the use of petroleum products. Gulf fuels and lubricants insure performance-plus from engines, help avoid mechanical delays and lower your maintenance costs. For full information, call your nearest Gulf office, or mail the coupon.

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Prestressed concrete short course next month

The second national Prestressed Concrete Short Course has been scheduled for January 27 through 31 at Ellinor Village, Daytona Beach, Fla.

The five-day course is planned to cover the theory and design of precast concrete structures and problems, and difficulties in sales, planning, production, quality control, delivery, and erection. Such advances as long-span design, unusual designs, and continuous-beam design will be of particular interest to engineers.

Featured during the course will be discussions by engineers of such subjects as specifications, standardization, quality control, and the design of bridges, buildings, lift slabs, and unusual structures. A field trip to a casting yard in the vicinity is being planned for a firsthand look at manufacturing methods.

Registration, which closes January 1, carries a fee of $10 per person. Registration must be made in advance with the Prestressed Concrete Short Course, Civil Engineering Department, University of Florida, Gainesville, Fla.

Manually erected bridge supports 60-ton loads

A floating bridge that can be erected manually and supports 60-ton loads has been developed by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

The M4T6 has lightweight components that can be transported by air. Its heaviest single component is a 750-pound neoprene-coated nylon float. At 15-foot intervals the pneumatic half-floats join together, forming a complete unit for support. Deflated floats are stored and transported in canvas bags.

Hollow aluminum alloy deck sections, less than 16 feet long and 225 pounds in weight are placed in a staggered position side by side to serve as a road surface. Steel beams and plywood panels provide stiffness, and distribute the load to the floats.

The bridge can be manually erected at rates up to 1½ fpm.

This mountainous area, where a road is being pioneered by a Cat D9, is typical of extremely rocky conditions that can damage tractor parts. But attachments, and skill in operation, can save much wear on the rig's components.

Wear on parts need not be excessive . . . when tractors work in rock

Contractors working tractors in rocky areas expect rough wear on many components of the machine. Track shoes, particularly, are subject to breakage in rock work. Rollers, idlers, links, pins, bushings, and final-drive sprockets wear out fast.

But wear on these units can often be held to a minimum.

Wide track shoes, for instance, are needed when mud or gumbo is encountered and flotation is important. But narrow-width shoes are best for rock work. The wide track shoes have greater overhang beyond the track link than the narrow shoes; consequent'y, more leverage is placed against the outer edges. As a result these wide shoes are frequently damaged in rocky areas.

When work is being done almost exclusively in rock, double grouser track shoes can be used to strengthen the shoe longitudinally and help it resist bending or cracking.

If a tractor has a two-position idler, track shoe grouser wear will be more rapid when the idler is in the "low" position. If the "low" position is held in reserve for use only when necessary, track shoes will last longer. One of the attachments most useful for a tractor doing work in rock is the track roller guard group. Experience in the field shows that track roller guards effectively protect the individual parts of the track. Very little, if any, damage is done to track parts when tractors are equipped with the guards. Without them, a tractor making a turn in rock will have rock feed between the rollers and the track. As the track moves backward or forward, a rock-crushing action is set up.

Are You Ready to Get Your Share of the $325,000,000* Swimming Pool Construction Market?

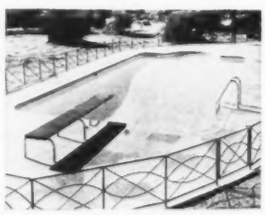
*Survey by Swimming Pool Age

AIRPLACO® Concrete Gunning Equipment Makes Pool Construction

FASTER • EASIER • MORE PROFITABLE

As the swimming pool becomes an increasingly familiar part of America's way of living, it opens up a tremendous new profit opportunity for you.

This opportunity can be even more profitable if you use AIRPLACO concrete gunning equipment for your pool construction jobs. You get the job done faster, easier, better and at a greater profit to you.



AIRPLACO PORTABLE RIG

The AIRPLACO rig consists of a job-proved BONDACTOR® or NUCRETOR,® the automatic proportioning, continuous mixing, elevating and screening MIX-ELVATOR, and the time-saving SAND-LOADER. Makes any concrete job easier, more profitable.

AIRPLACO concrete gunning equipment is available in a wide range of sizes to meet your production and job requirements from ½ to 7 cubic yards of aggregate per hour, and using air compressors with 75 to 600 CFM capacity.

FREE CATALOG

WRITE TODAY FOR FREE CATALOG . . . that will explain all the many benefits and specifications of AIRPLACO concrete gunning equipment or see your AIRPLACO distributor.

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Single, Double or Triple Plate CLUTCHES

Small Spring Loaded

Heavy Duty Spring Loaded

Oil or Dry Multiple Disc

Heavy Duty Over Center

Control POWER Better

The Over-Center, Spring-Loaded clutch shown above—when used in farm tractor LIVE POWER TAKE-OFFS—enables the harvesting unit to be controlled independently of tractor propulsion. It is used in various other ways and in other industries. And it is but one of many types and sizes of ROCKFORD friction CLUTCHES that have been designed and built to meet specific needs. If you have a special power control or power transmission problem, ROCKFORD clutch engineers will be glad to help you solve it.

Power Take-Offs

Speed Reducers

BW SEND FOR THIS HANDY BULLETIN Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER

314 Catherine St., Rockford, Ill., U.S.A.

Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

CLUTCHES

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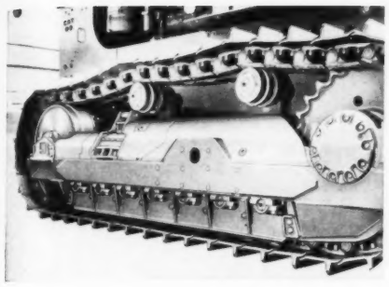


Track roller guards like these, bolted to the track roller frame of a Caterpillar D9, pay for themselves when tractors work in rocky conditions. They protect individual parts of the track against abrasion, and reduce maintenance and replacement needs.

When the rig backs up, rock also feeds in between the idler and the track; as the tractor moves forward, rock feeds in between the sprocket and the track. This leads to abrasive and impact damage.

This damage will occur to tractors without track roller guards even when the track tension is correctly adjusted. The chances of wear and damage, of course, are increased if track tension is too tight. The track recoil mechanism is designed so that the sprocket can, under some conditions, jump a tooth. This reduces the possibility of severe damage to the final drive. But when too much rock finds its way into the track, the recoil mechanism cannot allow the idler to move enough to feed the rock through. The tendency to stretch out the track causes unnecessary wear and strain on track links, pins, and bushings. The tight track absorbs horsepower and robs the tractor of its full productivity. In addition, it may result in damage to the tractor's final drives. The track roller guards, in addition to keeping rocks out of the track, also help keep tracks on the rollers in rugged and steep terrain and reduce wear on the roller flanges and idler pilot rim.

Before even starting a job, contractors will be wise to check job conditions so that tractors can be put in the best shape for the work they are to handle. By doing this, and by reconditioning all track components before they have worn beyond recommended limits, contractors will insure for themselves reduced downtime and lower operation and maintenance costs. THE END

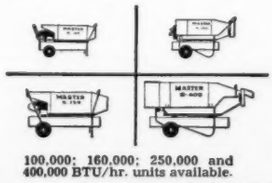
"Don't worry, if this clunker breaks down we'll roll you down the road."

BOSS... GET THIS HEATER!

We'll forget the cold weather and keep your winter profits high

"We won't be slowed down by cold weather. And we'll be a lot more comfortable, too, with a Master heater on the job.

"It puts out a steady stream of warm air wherever you want it. You can plaster, pour concrete, thaw and dry materials, spot heat outside, etc. It's portable, just wheel it around, plug it in and flip the switch. It'll run for 16 hours or more on a tank of kerosene or fuel oil. And for only 30c an hour it puts out enough heat to warm the biggest jobs. It's perfectly safe, too, boss . . . doesn't need a vent. So see your Master distributor, or write for all the facts on the new Master B-250 and other models. You'll see that only Master has all the features you want. No obligation."



100,000; 160,000; 250,000 and 400,000 BTU/hr. units available.

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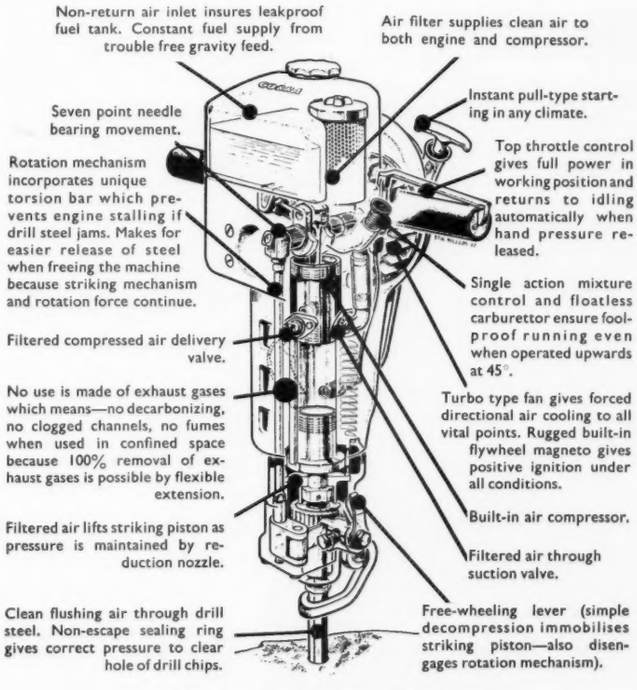
NEW COBRA

WORLD'S LIGHTEST MOTOR DRILL

After extensive field testing the new 100% self-contained motor drill/breaker from Atlas Copco is on the market. The COBRA is a versatile, portable tool weighing only 53 lbs, drilling to 13 ft at 26 ft per hour. The COBRA can be used at high altitudes up to 11,000 ft, and is specially designed for easy carrying. It is quickly converted to light breaker, and embodies all the outstanding features shown below, which make it the most up-to-date machine of its kind and one that has already proved its worth in many parts of the globe.


Non-return air inlet insures leakproof fuel tank. Constant fuel supply from trouble free gravity feed.
Air filter supplies clean air to both engine and compressor.
Seven point needle bearing movement.
Instant pull-type starting in any climate.
Rotation mechanism incorporates unique torsion bar which prevents engine stalling if drill steel jams. Makes for easier release of steel when freeing the machine because striking mechanism and rotation force continue.
Top throttle control gives full power in working position and returns to idling automatically when hand pressure released.
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Filtered compressed air delivery valve.
No use is made of exhaust gases which means—no decarbonizing, no clogged channels, no fumes when used in confined space because 100% removal of exhaust gases is possible by flexible extension.
Turbo type fan gives forced directional air cooling to all vital points. Rugged built-in flywheel magneto gives positive ignition under all conditions.
Filtered air lifts striking piston as pressure is maintained by reduction nozzle.
Built-in air compressor.
Filtered air through suction valve.
Clean flushing air through drill steel. Non-escape sealing ring gives correct pressure to clear hole of drill chips.
Free-wheeling lever (simple decompression immobilises striking piston—also disengages rotation mechanism).

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DST/86

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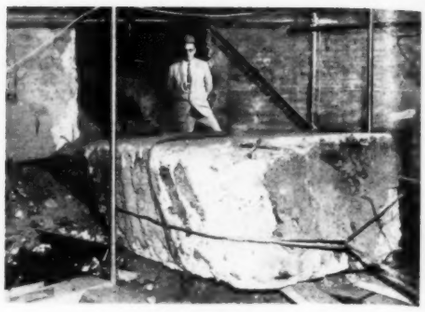
Iron and aluminum powder, fed to the lance handle and mixed with oxygen, is carried to the end of the black iron pipe, where it melts the concrete. Cutting is done at a speed of 1½ feet per hour.



Richard Bartlett, supervisor of the demolition project for General Electric, watches as the first section of concrete removed from the wall of the safety pit is ready to be hoisted out of the way.

Powder-lancing method cuts 30 per cent off cost of demolition job

Powder lancing—a process formerly restricted to cutting steel—has simplified the difficult job of demolishing concrete in the General Electric Laboratory of General Electric Co., Schenectady, N. Y. Not only that, but powder lancing saved some 30 per cent of the cost of demolition on this job.

This building is being converted into a new million-dollar radiation laboratory by the company, but before the modification job could be started, more than 8,000 cubic feet of concrete had to be removed from the structure.

The bulk of it was in the concrete safety walls, which ranged up to 4 feet in thickness, at the high-speed pit formerly used for testing steam turbines. The hexagon-shaped turbine-testing pit had two concrete safety walls separated by 6 feet of packed sand. The inner wall was 3 feet thick, the outer wall, 4 feet thick. Both stood about 16 feet high.

James E. Lowe & Sons Co., Schenectady, N. Y., handled the demolition job by powder lancing the walls into huge 20×16-foot sections weighing up to 18 tons each.

This method is an outgrowth of the powder-cutting process introduced by Linde Co., Division of Union Carbide Corp., as a method of cutting stainless steel. New developments in equipment and techniques give this method the edge on demolition jobs where mechanized demolition is too costly, where time is important, and where blasting cannot be done.

Operators used a manually operated lance consisting of a lance handle with one or more lengths of black iron pipe attached. A mixture of iron and aluminum powder was fed pneumatically into the lance handle, mixed with oxygen, and carried to the cut by the pipe. The bombardment of burning iron and aluminum particles melted the concrete. The cutting speed was about 1½ feet per hour.

As each section of concrete was separated from the wall, it was hoisted out of the pit by a 100-ton bridge crane and hauled away. James E. Lowe & Sons finished its part of the job a few weeks ago; now, G-E is getting ready for the next big job of converting the building to its new radiation laboratory. THE END

GALION on the St. Lawrence Seaway Project

GALION
NOTHING BUT ROCKS!
Galion Model 118 Motor Grader working on Melochville Development in connection with St. Lawrence Seaway project.

Rough Service Wears Out, on an Average, a Set of Blades Per Day!

The GALION Model 118 Motor Grader shown in the photo is used for spreading rock fill over swampy areas. This work is so severe that it wears out a set of grader blades practically every day. Service of this kind makes itself felt through every part of a grader—and it takes the most rugged construction to stand up under the grinding, jolting shocks and strains of this rough, rocky going—but the GALION 118 takes it all in stride.

HYDRA-TILT MOLDBOARD

An exclusive GALION attachment for varying moldboard pitch by hydraulic power. It quickly provides the exact pitch best suited for various jobs and materials.

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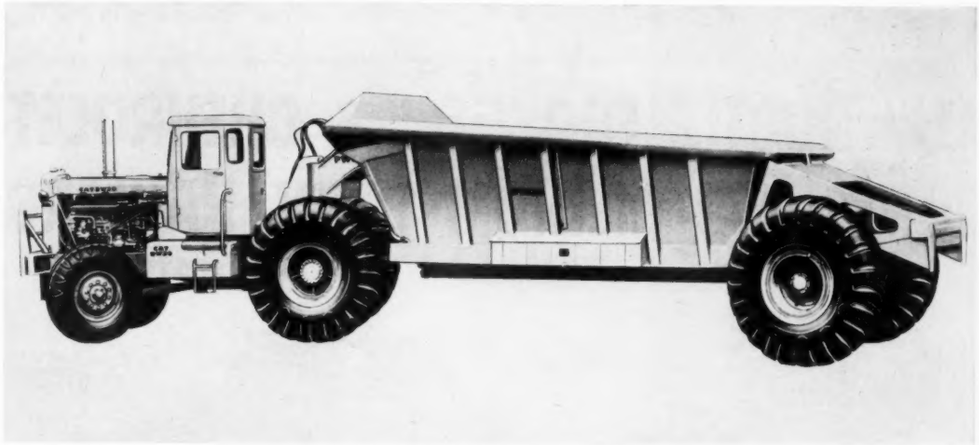
MOTOR GRADERS & ROLLERS

For more facts, use Request Card at page 18 and circle No. 259

PRODUCT PARADE

For further information on any of the products described in the following section, circle the designated number on the Request Card at page 18.

Lightweight bottom dump features 40-ton capacity



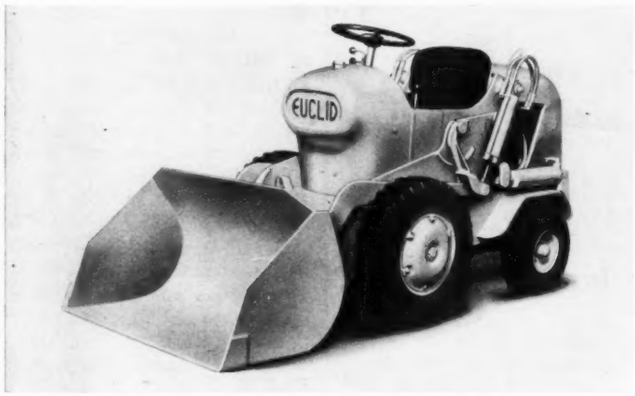
The use of T-1 steel in the construction of the Athey Corp.'s new Model PW20 bottom-dump trailer is said to provide a unit that is almost four times lighter than its 40-ton capacity.

According to the manufacturer, another outstanding feature of the Model PW20 is the rear door design, in which the rear door opens simultaneously with the bottom doors and permits material to flow smoothly out to the rear; the trailer rides out over the dumped load. The unit has 18-degree side angles, and its bottom doors measure 15 feet 10½ inches long and 6 feet wide.

The PW20, according to the firm, can spread or windrow loads, as well as dump instantly. An air release opens the doors either instantly or under hydraulic pressure for controlled dumps. When closed, the doors are locked with a positive mechanical latch which relieves the hydraulic system of all load.

Matched to the Caterpillar DW20 tractor, the PW20 has speeds up to 32.1 mph, and can make 90-degree turns in approximately 38 feet, the manufacturer reports.

For further information write to the Athey Products Corp., Dept. C&E, 5631 W. 65th St., Chicago 38, Ill., or use the Request Card at page 18. Circle No. 113.



First of new loader line designed for tight work

The Euclid Division of the General Motors Corp. announces a new front-end loader with a rated payload capacity of 19 cubic feet.

Designated Model L-7, the machine is equipped with a torque converter and power shift transmission featuring non-stop, high-low shift. Speeds up to 11 mph are offered both in forward and reverse.

The L-7 has a 4-foot wheel base, with an over-all length with the bucket down of 10 feet 1½ inches. Turning radius for the new unit is only 6 feet 2½ inches, and there is a 5-inch ground clearance.

This Euclid loader has rear-wheel steer. The unit is powered by a Continental 49-hp gasoline engine.

For further information write to the Euclid Division, General Motors Corp., Dept. C&E, 1361 Chardon Road, Cleveland 17, Ohio, or use the Request Card at page 18. Circle No. 114.

Huge wheel-type, drawn ripper penetrates 3 to 5 feet

Its new 25,000-pound wheel-type, drawn ripper is offered by the Southwest Welding & Mfg. Co.

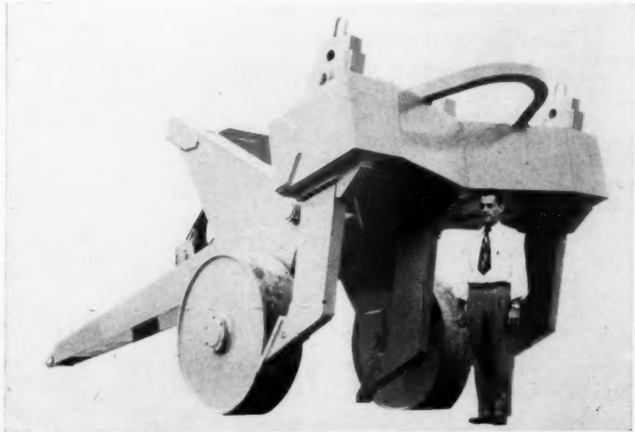
Known as the Southwest extra-heavy Model RXH-3, the new ripper is said to incorporate such structural features as box beam sections of special design to withstand the most severe job conditions.

According to the manufacturer, the unit's wheels are drum-type, mounted on Timken bearings. Control of the ripping depth is handled through the cable, and is said to be quick and positive.

The new RXH-3 has an over-all length of 25 feet, a width of 10 feet 8 inches, and a height of 8 feet 10 inches.

Although the unit is designed for three depths of penetration—36, 42, and 48 inches—a special center shank can be furnished to give a maximum penetration of 60 inches.

For further information write to the Construction Machinery Division, Southwest Welding & Mfg. Co., Dept. C&E, 3201 W. Mission Road, Alhambra, Calif., or use the Request Card at page 18. Circle No. 115.



No tools are needed to fabricate to size Dow Chemical's new plastic foam perimeter and cavity wall insulating material. Called Scorbord, the material consists of smooth-surfaced boards of expanded polystyrene, 1 inch thick, 2 feet wide, and 8 feet long. White lines mark striations where the board can be broken into different widths. For further information write to **The Dow Chemical Co.**, Dept. C&E, 1000 Main St., Midland, Mich., or use the Request Card at page 18. Circle No. 52.

NEW HUSTLE FOR '58 . . . CHEVROLET LIGHT- AND MEDIUM-DUTY HAULERS

More horsepower . . . more staying power in V8's and 6's!

New Chevrolet light-duty Apache and medium-duty Viking models bring you V8's and 6's that deliver more horsepower, more economical and dependable hauling for the toughest jobs you've got!

There's new standard power in every light-duty model . . . a more powerful (145 h.p.!) edition of the engine most famous for economy and dependability, the rugged Thriftmaster 6. And the optional (extra-cost) Trademaster V8 is *all new*, the most highly powered light-duty truck engine in Chevrolet history! It's ready to go to work with 160 h.p., 283 cubic inches of displacement, short-stroke efficiency and weight-saving compactness!

Chevy for '58 is here with new medium-duty power, too! Standard in Series 50 L.C.F. models is a new version of the Heavy-Duty Taskmaster V8, with 160 h.p. for fleet hauling and new durability features such as Stellite-faced exhaust valves and induction-hardened exhaust valve seats. And standard in Series 60 models is the time-proved Jobmaster 6 with more power than ever—150 h.p.—and a host of new features that mean more economy and dependability on jobs that work a truck hard. See your Chevrolet dealer and *save* with Chevy's new brand of hustle! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Latest editions of the "Big Wheel" in trucks

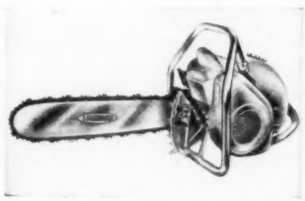
NEW CHEVROLET TASK·FORCE 58 TRUCKS CHEVROLET

For more facts, use Request Card at page 18 and circle No. 260

Direct-drive chain saw works in all posiitons

A new direct-drive chain saw featuring a diaphragm carburetor that permits cutting in all positions is announced by the Lombard Governor Corp.

Designated Super 6 (D-64), the saw develops over six horsepower, and is designed with a flameproof muffler



directed forward, out of the way. There is a convenient manually operated oiling device on the rear handle bar.

Other Lombard Super 6 engineering features include: positive action starter; lightweight design for easy carrying and handling; wrap-around handle bar and sprocket shield; and a heavy-duty oversize clutch to accommodate lugging speed.

The saw is available in 16, 20, 24, 30, and 36-inch sizes. A choice of either an Atkins or Oregon 7 1/16-inch pitch chain is offered.

For further information write to the Lombard Governor Corp., Dept. C&E, 300 Main St., Ashland, Mass., or use the Request Card at page 18. Circle No. 58.

Joint-sawing machine for large highway jobs

Its Jointmaster concrete-sawing machine for use on large airbase and highway sawing jobs is offered by Concut Sales, Inc.

The machine is available in two models, Model 1200 and Model 2400, for cutting joints on road widths of 12 and 24 feet, respectively.

The unit is equipped with hydraulic drive for easy handling. Its saw carriage is raised and lowered hydraulically, and it has hydraulic torque converter cross feed.

Standard equipment on both models is a 36-hp gasoline engine; a 70-hp engine is also available. A separate

Designed to cut joints in 24-foot-wide highway lanes, this Jointmaster Model 2400 eliminates the need for marking transverse joints and for turning the saw around on the initial lane of a highway. A 12-foot-wide model is also available.

18-hp gasoline engine operates the hydraulic system and power drive. Both units operate on concrete, with optional equipment available for operating on side forms.

According to the manufacturer, the Jointmaster eliminates both the need for marking transverse joints and for turning the saw around on the initial lane of a 12 or 24-foot highway. A substantial saving in time and labor is also claimed, due to the speed with which the machine moves from joint to joint, and the increased cutting speed through the use of 2 or 4 blades instead of just one.

For further information write to Concut Sales, Inc., Dept. C&E, 1845 N. Belcroft Ave., El Monte, Calif., or use the Request Card at page 18. Circle No. 44.

Photo-copying device works face-down on books

A photo-copying machine featuring a plastic air-cushion said to make it usable face-down on open books, magazines, and other bound material is offered by F. G. Ludwig, Inc.

Designated Contoura-Portable, the unit is brief-case size for added convenience of carrying. According to the manufacturer, it makes transparencies for use with Diazo machines, as well as negative film, in 8 seconds, for offset printing plates.

For further information write to F. G. Ludwig, Inc., Dept. C&E, 105 Coulter St., Old Saybrook, Conn., or use the Request Card at page 18. Circle No. 2.

Offer coiled tie wire for reel dispensers

Tie wire for tying concrete reinforcement, metal lath, wire fabric, and many other jobs is available from the Northwestern Steel & Wire Co.

Designated Sterling rebar tie wire, the product is coiled to fit all standard reel dispensers, eliminating the many risks in carrying wire in a loose and unprotected fashion, the manufacturer reports.

For further information write to the Northwestern Steel & Wire Co., Dept. C&E, Sterling, Ill., or use the Request Card at page 18. Circle No. 29.

For more facts, circle No. 261→

Traffic-line remover shaves paint at 10 fpm

A machine for removing traffic pattern paint lines is offered by the Asbury Corp.

Powered by a Wisconsin motor, the machine is said to shave off traffic lines at a rate of more than 10 fpm, depending on the nature of the surface. A plate, on which is located a rotary drum containing pivoted cutters, is supported by hinges from the front end of the motor chassis. Attached to the plate, and easily controlled by the operator, is a feed screw mechanism for vertically adjusting the tool to the work surface.

The cutters are designed for long life, and may be replaced quickly and simply by hand and without tools, the manufacturer reports.

For further information write to the Asbury Corp., Dept. C&E, 717 Isle of Palms, Fort Lauderdale, Fla., or use the Request Card at page 18. Circle No. 9.

Boulders are received, broken, and shipped from this central dock. On-the-job air power provided by the Tractair helps to minimize handling of material.

Tractair* Cuts Fill Costs; Breaks Rocks in R. R. Cars

Le Roi unit provides mobile air power for breakers, replaces slow hand-sledging.

Mobildrill attachment expands usage for construction and road-building.

Providing on-the-job air power for breaking rocks in gondola cars is a novel as well as a paying application of the Le Roi Tractair. Servtex Materials Co., New Braunfels, Texas, reports that this unusual use of the tractor-compressor reduces boulders to usable ½ cu. yd. size for dam fill faster and at less cost than the hand-sledging method used previously.

In this operation, boulders are brought by trucks and dumped into waiting gondola cars at the central receiving-shipping dock. As soon as the rocks are unloaded, the operator drives the Tractair close to the car and starts breaking.

Lowers Handling Costs

The self-propelled air supply keeps crews and equipment busy, assuring a steady flow of rock for construction and fill. What's more, reducing run-of-pit rock with Tractair-powered breakers eliminates delays and additional handling of material.

Bringing compressed air close to the job eliminates the need for positioning cars. Car-side air supply also shortens hose lines, thus assuring full-capacity power for the breaker. When desired, Tractair's 125 cfm output is adequate to operate two breakers at the same time.

Performs Other Jobs

Because of its ability to move from one work area to another under its own power, the Tractair is never idle. When its primary job is finished, the unit is used elsewhere.

"We use the Tractair to drill holes for blasting out placements for fence posts, power poles, and phone poles," the superintendent explains. Equipped with a Mobildrill attachment, the tractor-compressor is also used for building roads where boulders have to be drilled, blasted, and removed.

Find out how the Tractair can lower the cost of your jobs. Also investigate the cost-cutting advantages of Tractair attachments. Let Le Roi show you how this combination can minimize your outlays for one-purpose equipment, and enable you to perform specialized tasks at a fraction of former cost.

*"Tractair" is the registered trademark for Le Roi's combination tractor-air compressor.

WABCO

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Newmatic air tools, portable and Tractair® air compressors, stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

Breaking rocks in gondola cars shows how versatile the Tractair can be in reducing costs. The Le Roi Mobildrill attachment is shown mounted on the rear of the tractor-compressor.

Tensioning strands can be restrained from splaying outward during the tension-relieving cycle by binding them with loops of Signode steel strapping, the manufacturer reports. In a typical application, five feet of 1¼-inch heavy-duty strap reportedly will replace 4½ feet of No. 6 reinforcing rod. A single tool can be used for tensioning, sealing, and cutting the strap. For further information write to the **Signode Steel Strapping Co.**, Dept. C&E, 2600 N. Western Ave., Chicago 47, Ill., or use the Request Card at page 18. Circle No. 19.

Dozer attachment permits in-the-seat blade tilting

A new hydraulic cylinder attachment for tilting Cat No. 7S bulldozers controlled by No. 25 cable controls is announced by the Caterpillar Tractor Co.

The hydraulic cylinder reportedly replaces the bulldozer blade's left tilt brace and provides in-the-seat blade tilting. The cylinder has a 7¼-inch bore and 7-inch stroke, and is operated by a front-mounted single valve No. 44 hydraulic control, which is available separately.

In order to allow maximum blade tilting, bulldozer trunnions have been redesigned on all new No. 7S bulldozers. By use of the hydraulic cylinders, the blade may be tilted to either side, so that the raised corner is approximately 38 inches above the ground, according to the company.

The standard D7 track shoe, of 20-inch width, may be used with the tilt cylinder and redesigned trunnion.

For further information write to the Caterpillar Tractor Co., Dept. C&E, Peoria, Ill., or use the Request Card at page 18. Circle No. 20.

Color coating process for photocopy production

A new color coating process for the photocopy paper used with its equipment is announced by the American Photocopy Equipment Co.

The process, called "vanishing tints", is designed to speed handling and increase copy production. The emulsion side of Apeco papers is colored pink for the positive paper and green for the negative paper, enabling the operator of an Auto-Stat machine to distinguish at a glance: (1) which side is the emulsion, and (2) which is the positive and negative paper.

With this process, the tints on the photocopy papers vanish in the normal machine processing procedure. When completely processed, the tints disappear and the copies come out in clear, sharp black and white, the manufacturer reports.

For further information write to the American Photocopy Equipment Co., Dept. C&E, 1920 W. Peterson Ave., Chicago 26, Ill., or use the Request Card at page 18. Circle No. 17.

POWER VANE

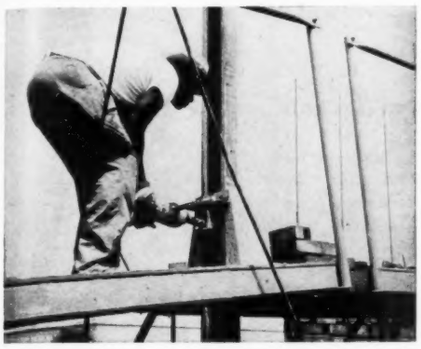
This Model 600 "POWER VANE" Rotary proved ideal for supplying air for the CP Trenchdrils on a pipeline construction job where portability over bad ground and unfailing operation when tilted up to 30° were essential.

CP "POWER VANE" Rotaries are used under job conditions where there's no room for failure . . . in all climes . . . in all parts of the world . . . in deserts, high altitudes and at sea. CP "POWER VANE" Rotaries stand up—they can "take it" and still provide hour after hour of air power with a minimum of attention and upkeep. Let your CP equipment dealer give you complete information. *Chicago Pneumatic Tool Co., 8 East 44th St., N. Y. 17, N. Y.*

in desert sands . . .

CP rotaries

. . . of California desert. (temperatures up to 120°F) the "POWER VANE" Rotary does its job from dawn to dark



The new Power-Lift scaffolding features easy adjustment to keep the mason and his material platform at the most convenient work level. By simply using a drill, the whole platform can be raised or lowered to any desired level.

Adjustable scaffolding big aid in masonry work

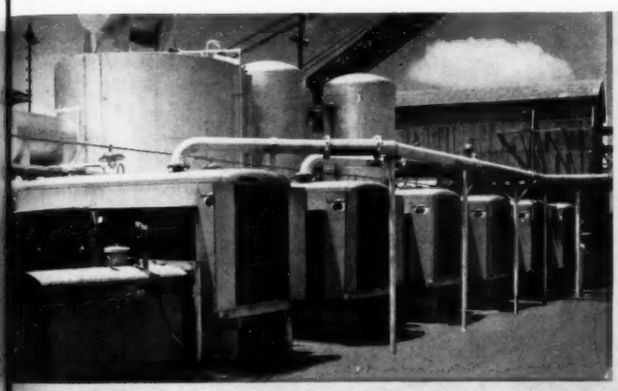
Its Power-Lift scaffolding, said to be designed to always keep the mason and his material platform at the most convenient work level, is available from the Power-Lift Scaffolding Corp.

By simply using a drill, the whole platform, including mason, mortar, and cube of bricks, can be raised or lowered to any desired level with absolute safety, the manufacturer states. The platform can go 16 feet high, with 10-foot extensions available for a maximum height of 100 feet.

According to the company, one 1½-ton truck can transport 100 feet of Power-Lift scaffolding, including 16-foot towers, extensions, platforms, and brackets. Each unit is especially designed for one-man operation.

The scaffolding comes in 10-foot sections and includes two 16-foot towers, a transfer box for adjusting height, and an offset footboard with adjustable side brackets. The 5×10-foot material platform and 2×10-foot footboard are of ⅞-inch marine plywood. The scaffold itself is reinforced steel framing throughout.

For further information write to the Power-Lift Scaffolding Corp., Dept. C&E, 15231 Burbank Blvd., Van Nuys, Calif., or use the Request Card at page 18. Circle No. 21.



At sea, this battery of Model 900 "POWER VANE" Rotaries serve aboard a barge used in off-shore operations in Venezuela. Service records under similar exacting conditions made CP units a natural selection.

...or by the sea

"keep rolling"

One of many CP Rotaries at the site of the St. Lawrence Seaway. They're operating all-year 'round, 24-hours a day even in sub-zero weather.

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

For more facts, use Request Card at page 18 and circle No. 262

New power transmissions for heavy-duty rigs

A complete line of Transomatic power-shifting transmissions designed for use with truck mixer, construction, and earthmoving equipment, is announced by The Transmission & Gear Co.

The new series consists of three models rated at 65, 100, and 150 horsepower.

Each transmission has 4 speeds forward and 4 speeds reverse. Shifting of speed and reversing are accomplished with oversize, large-capacity, hydraulically-actuated clutches running in oil. All gears are in constant mesh and are mounted on anti-friction bearings.

For further information write to The Transmission & Gear Co., Dept. C&E, 10421 Haggerty Ave., Dearborn, Mich., or use the Request Card at page 18. Circle No. 13.

Portable heating unit operates on LP gas

Its Jet Model 100-S portable heater is announced by Cimco.

According to the manufacturer, the new Jet carries like a suitcase in one hand, with LPG tank in the other. Its small diameter allows it to be placed in small tubes for material heating or under various types of vehicles for winter starting.

The 100-S runs from any LP gas tank and with the normal setting will produce 100 Btu's of heat, the manufacturer reports.

For further information write to Cimco, Dept. C&E, Box 422, Marshalltown, Iowa, or use the Request Card at page 18. Circle No. 11.

The new design changes in this I&E compressor feature a sharp reduction in bulk and weight. The unit is available in five models, from 55 to 320 cfm.

New compressor design cuts bulk, weight

Newly designed D-type, diesel-driven, and wholly air-cooled I&E portable compressors are announced by Air Compressors, Inc., of Jacksonville, Fla.

According to the company, the new design eliminates some of the bulk of the air receiver, thus sharply reducing the length and weight of the compressor.

Also included in the design of these West German imports is direct electric starting, without aid of secondary fuels or engines; non-burning compressor exhaust valves; automatic unloading and idling at pre-set maximum pressure; and simplicity of operation and control.

These I&E compressors are available in five models, rated from 55 to 320 cfm.

For further information write to Air Compressors, Inc., Dept. C&E, P. O. Box 2976, Jacksonville, Fla., or use the Request Card at page 18. Circle No. 15.

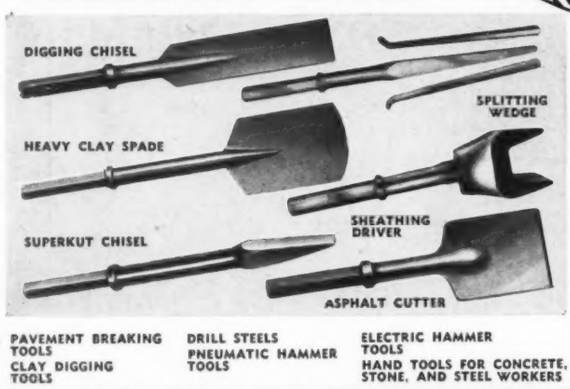
Specify VULCAN FOR YOUR PAVEMENT BREAKING TOOLS

Quality Made For Your Protection

VULCAN manufactures a complete line of top quality tools for the toughest pavement breaking applications known. VULCAN tools are designed to meet today's construction demands where the use of more powerful hammers requires better tools — where work deadlines must be met — where equipment must be the best.

Not only do Vulcan tools offer absolute dependability and satisfaction at lowest possible cost, but their toughness and unexcelled performance are VULCAN extras that you get at no added cost.

Why not test the rugged strength and durability of VULCAN tools today?



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Specialists in the Design and Production of Pneumatic Tool Accessories

For more facts, use Request Card at page 18 and circle No. 263

Concrete-cutting blades may be used wet or dry

Its new GreenCon specifications can now be used either wet or dry at the contractor's option, the Clipper Mfg. Co. announces.

The new wet or dry GreenCons are double reinforced through the center

of the blade. In addition, each blade is reinforced on both sides at the hub, where the strain is greatest.

According to the company, the blades are available in a complete range of specifications for cutting a wide range of "hard to soft" limestone aggregates, plus coral, steel mill slag, aggregates with percentages of granite, crushed river gravel, and many others.

For further information write to the Clipper Mfg. Co., Dept. C&E, 2800 Warwick, Suite 149, Kansas City 8, Mo., or use the Request Card at page 18. Circle No. 34.

INGRAM rollers

TANDEM and 3 WHEEL ROLLERS AVAILABLE IN ALL SIZES

Acme IRON WORKS
P.O. BOX 2020 • SAN ANTONIO 6, TEXAS

For more facts, use Request Card at page 18 and circle No. 264

Three new accessories for portable hoist units

A prefabricated loading ramp and an automatic gate are recent additions to the line of accessories for Buck portable Hoistowers.

According to the company, the ramp merely hooks on, with no nuts or bolts needed. Two men can quickly install it on either side of a trailer-mounted Hoistower base; the ramp remains in place as the platform is raised and lowered.

The automatic gate closes when the platform is raised, opens as it is lowered. It has been designed to fit existing platforms and is available with new units.

Another new accessory is a reverse

New accessories available for use with Buck portable Hoistowers include a prefabricated loading ramp and an automatic gate. The ramp, as shown in photo, merely hooks onto the base, with no nuts or bolts needed.

dumping extension, for use on Buck self-dumping concrete buckets. This device has been developed so that the Hoistowers can be used to dump concrete on either side of the tower.

For further information write to the Buck Equipment Corp., Dept. C&E, 720 Anderson Ferry Road, Cincinnati, Ohio, or use the Request Card at page 18. Circle No. 24.

Track rail for tractors added to parts line

A heavy-duty track rail for use on International, Allis-Chalmers, and Caterpillar tractors has been added to its line of crawler-tractor replacement parts by the Hensley Equipment Co., Inc.

According to the manufacturer, the new rail is forged from high-quality steel and heat-treated to insure correct Brinnell hardness. Pins and bushings are machined for precision fit.

For further information write to the Hensley Equipment Co., Inc., Dept. C&E, 800 Peralta Ave., San Leandro, Calif., or use the Request Card at page 18. Circle No. 36.

Announce improved line of chrome-plated saws

A new, improved line of Si-Clone chrome-plated saws is offered by the Simonds Saw & Steel Co.

Chrome plating reportedly increases the edge-holding qualities of the steel and prevents rust and accumulation of gum and pitch on the sides of the saw. Friction and heating are also reduced, greatly increasing saw life, the manufacturer states.

Nine types of saws are available in the new line, with a choice of round, square, oblong, or diamond-shape centerhole as required for use on popular makes of table, radial arm, and portable electric handsaw machines.

The saws are available up to 12 inches in diameter.

For further information write to the Simonds Saw & Steel Co., Dept. C&E, 510 Safety Fund Bank Bldg., Fitchburg, Mass., or use the Request Card at page 18. Circle No. 23.

A new addition to the Ford line of gasoline-engine tractors is this Model 841 Powermaster, equipped with optional power steering and auxiliary over-under transmission for 12 forward and 3 reverse speeds. The Powermaster class, which includes six models, now develops 44 drawbar horsepower, reportedly a boost of 10 per cent over the largest tractors previously made by Ford. For further information write to the Tractor & Implement Division, **Ford Motor Co.**, Dept. C&E, 2500 E. Maple Road, Birmingham, Mich., or use the Request Card at page 18. Circle No. 28.

Harbormaster
the complete, heavy-duty marine power and steering package

easily installed, rugged, economical, highly maneuverable

Harbormaster Outboard Propulsion and Steering gives your craft rugged power, plus complete 360° maneuverability and the advantages of low cost installation, operation and maintenance.

Harbormasters are easily installed for immediate use and are a ready answer to many tough marine problems. They are ideal in shallow or deep water . . . for coastwise service as well as in harbors, lakes, canals, and rivers.

Harbormasters have been proved in hundreds of installations. Send for your copy of catalog which gives complete details.

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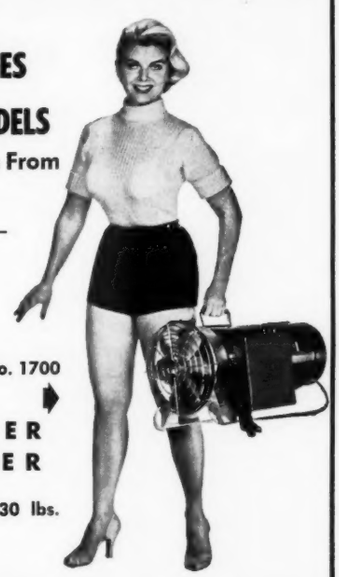

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BLOWER HEATER
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PORTABLE LP-GAS HEATERS FOR EVERY PURPOSE

GET CLEAN, INSTANT, LOW COST HEAT — ANYTIME, ANYWHERE — INDOORS, OUTDOORS — FROM INSTO-HOT HEATERS. ENGINEERED AND MANUFACTURED BY INSTO-GAS CORPORATION — LEADER IN PORTABLE HEAT SINCE 1933.

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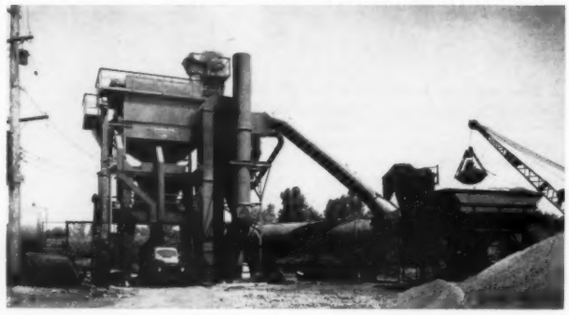
For more facts, use coupon or circle No. 267

Many new features are incorporated in this newly designed asphalt plant from the Colonial Iron Works Co.



New asphalt-plant design offers many innovations

A new design in asphalt plants is announced by the Bollard Asphalt Plant Division of the Colonial Iron Works Co.

The first operating unit of this design was recently installed for the Bedford Heights Material Co., of Bedford Heights, Ohio.

According to the manufacturer, the current design permits the installation of either a 1, 2, or 3-ton-capacity mixer in the same tower, with only a few minor changes in the mixer platform. The Bedford Heights unit has a 2-ton-capacity mixer, and is rated at 120 tons per hour as a semi-automatic batch plant.

Another unusual feature of the plant is a roller chain drive device for rotating the dryer. Mounted midway through the dryer length, it eliminates the ring gear used on most dryers, thus reducing the dryer weight by approximately 1,500 pounds.

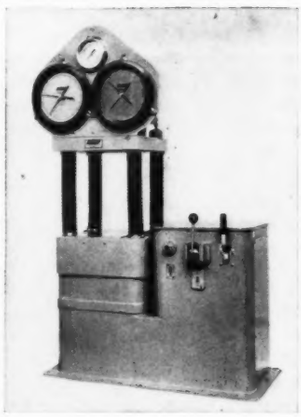
Fabrication of standard parts on the new design is progressing at Colonial's plant, but custom units will also be made. All plants are completely fabricated in the shop and shipped in easily assembled units, the manufacturer states.

For further information write to the Bollard Asphalt Plant Division, Colonial Iron Works Co., Dept. C&E, 17625 St. Clair Ave., Cleveland 10, Ohio, or use the Request Card at page 18. Circle No. 7.

Concrete-testing machine has 175-ton capacity

Its Model LT-600 concrete-testing machine, a 350,000-pound-capacity precision unit designed especially to release more expensive and elaborate testing machines for other work, is available from Forney's, Inc.

The new machine can be equipped with standard accessories for testing 2×2-inch and 6×6-inch cubes; 3×6-inch and 6×12-inch cylinders; concrete blocks up to 8×12×18 inches in compression; beams and lintels up to 8×8×48 inches in flexure; and brick compression and modulus of rupture.



The low-pressure gage is calibrated in pounds 0 to 60,000; the high-pressure gage, 0 to 350,000. Also incorporated into the machine is a test gage for spot checking and recalibration.

For further information write to Forney's Inc., Dept. C&E, Box 310, New Castle, Pa., or use the Request Card at page 18. Circle No. 27.

New telescopic lift extends to 40 feet

A new 1,000-pound-capacity unit has been added to its telescopic lifts by the Allied Mfg. & Sales Co.

Designated Grand Sky-Ride Model J2531, the hydraulic-powered unit has a total lift to 40 feet high when extended, and can be stopped and locked at any intermediate height; its overall height in completely retracted down position is 9 feet 2 inches. Steel-molded rubber roller-bearing wheels make the machine portable, and 10-foot 9-inch outriggers insure secure footing on the ground.

A 1½-hp, 60-cycle 110/220-v ac motor operates the oil hydraulic lifting mechanism, with dead-man type controls at the base and on the platform. A 110-v outlet on the platform

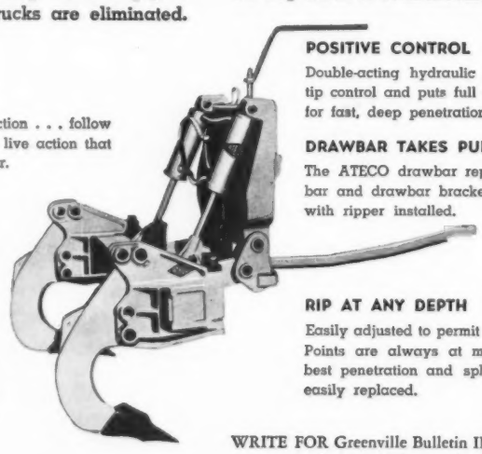
TREMENDOUS RIPPING TEAM

The tremendous power of the IH TD14, TD18 or TD24, plus the 10,000-pound Greenville tractor-mounted rock ripper shatter rock and packed earth for easy scraper loading. On many jobs explosives, shovels and trucks are eliminated.

Put this power-packed team to work for you. Your IH dealer can give you the facts. Let him show you how you can save as much as 25% on any earth or rock moving job.

LIVE SWIVEL ACTION
Shanks swivel 15° in either direction . . . follow tractor like a trailer. Points have live action that shatters rock like a jack hammer.

RUGGED POWERFUL SHANKS
Scientific contour gives extra strength at strain points and pulls points down deep . . . rocks roll out and clear of headframe. Made of tough, heat-treated, manganese-moly steel. Mount one, two or three shanks as needed.



POSITIVE CONTROL
Double-acting hydraulic system provides fingertip control and puts full tractor weight on points for fast, deep penetration.

DRAWBAR TAKES PULL
The ATECO drawbar replaces the tractor drawbar and drawbar brackets. Clevis is accessible with ripper installed.

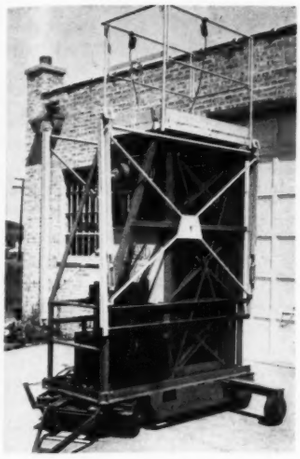
RIP AT ANY DEPTH
Easily adjusted to permit settings as deep as 24". Points are always at most desirable angle for best penetration and splitting action. Points are easily replaced.

WRITE FOR Greenville Bulletin IH-156. It gives complete data on the Greenville-Ateco ripper.

ATECO

GREENVILLE
STEEL CAR COMPANY
ATECO DIVISION
Greenville, Pennsylvania

For more facts, use Request Card at page 18 and circle No. 268



The Grand Sky-Ride Model J2531 hydraulically powered lift has a 1,000-pound capacity. The unit provides a total lift of 40 feet. When completely retracted, as shown in photo, its overall height is 9 feet 2 inches.

facilitates use of electrically powered tools and other equipment.

Safety features include a control valve at the hydraulic fluid return outlet, factory set to control descent of the platform in case of unexpected leakage.

For further information write to the Allied Mfg. & Sales Co., Dept. C&E, 3101 W. Grand Ave., Chicago 22, Ill., or use the Request Card at page 18. Circle No. 78.

New angle-iron shear has 18-ton capacity

Its Model 607 hydraulic angle-iron shear is available from the W. A. Whitney Mfg. Co.

This 18-ton-capacity unit stands only 26 inches high; it shears angle iron up to 4×4×¼-inch, and bends 6×⅜-inch flat mild steel.

As an auxiliary, a straight shear blade is available to replace the angle-iron shear blade for shearing flat stock up to 5/16×6 inches wide. Additional blades for shearing channel iron and round, flat, or square bars, as well as a forming die for 90-degree right angle bends, are also available.

For further information write to the W. A. Whitney Mfg. Co., Dept. C&E, 636 Race St., Rockford, Ill., or use the Request Card at page 18. Circle No. 35.

New plywood sheathing permits outdoor storage

A new plywood sheathing, reportedly qualified to store outdoors mold-free and without delamination up to a year, is announced by the Georgia-Pacific Corp.

The sheathing is available in standard 4×8-foot panel size, and in five thicknesses: 5/16, ⅜, ½, ⅝, and ¾-inch. All panels are edge-sealed with a special black-colored sealer to help prevent moisture absorption.

For further information write to the Georgia-Pacific Corp., Dept. 13-A, Dept. C&E, The Equitable Bldg., Portland, Oreg., or use the Request Card at page 18. Circle No. 37.

Automatic blade control offered for motor grader

Preco, Inc., announces a new automatic blade control made exclusively for Cat No. 12 motor graders.

The unit is designed to automatically keep the grader blade at any desired slope, with a reported accuracy to within ⅛ inch in 10 feet. It is said to be equally useful and accurate for making finish bank cuts, sloping shoulders, working between forms for establishing subgrades—virtually any blade position needed for normal grader operation.

According to the manufacturer, with the Preco automatic blade control installed on the control panel of the

motor grader, the operator simply dials the specified slope on the dial, which is calibrated in both per cent of slope and slope ratio. The device automatically holds the blade to this position, regardless of the terrain and position of the grader frame.

Where manual operation is desired, the Preco control can be overridden by the operator, or shut off completely. The unit is powered by the standard battery, and can be easily installed.

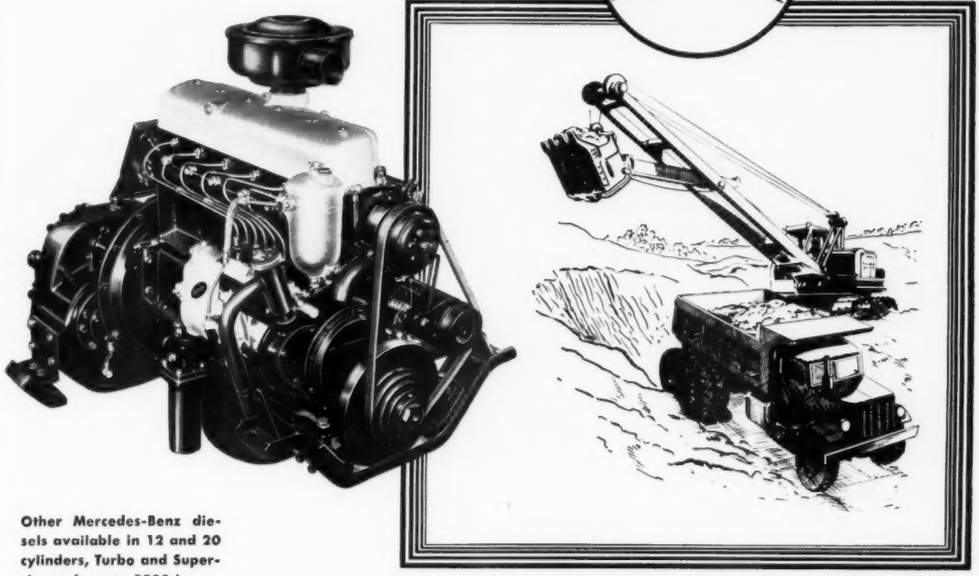
For further information write to Preco, Inc., Dept. C&E, 6300 E. Slauson Ave., Los Angeles 22, Calif., or use the Request Card at page 18. Circle No. 111.

To obtain further information on any of the products described in this section, circle the number given at the end of the item, on the Request Card at page 18.

MERCEDES-BENZ DIESEL ENGINES

Now Available to Power Equipment in the CONSTRUCTION INDUSTRY

On all types of jobs, under all conditions of terrain and weather, the effortless performance and ultra-dependability of a Mercedes-Benz diesel helps keep costs down and profits up . . . . Engines are now available in ratings from 36 to 1385 h.p. to power practically every machine used by the modern day construction industry.



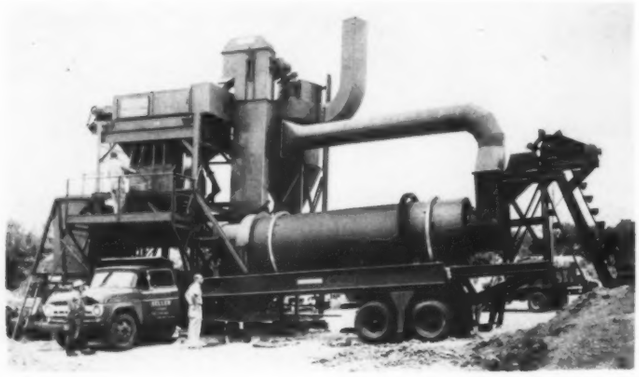
Other Mercedes-Benz diesels available in 12 and 20 cylinders, Turbo and Supercharged, up to 3000 h.p.

All Mercedes-Benz diesel engines are 4-stroke and work on the time-proven, pre-chamber combustion process, assuring greatest possible quietness and smokeless combustion even under changing loads and different fuel qualities . . . Mercedes-Benz diesels are liquid cooled and equipped with an automatic control guaranteeing complete operating safety, even under extreme climatic conditions . . . Other plus features include their easy handling, simple maintenance, economical fuel consumption and the small space required for installation . . . Unusually long life is a proven fact with Mercedes-Benz!

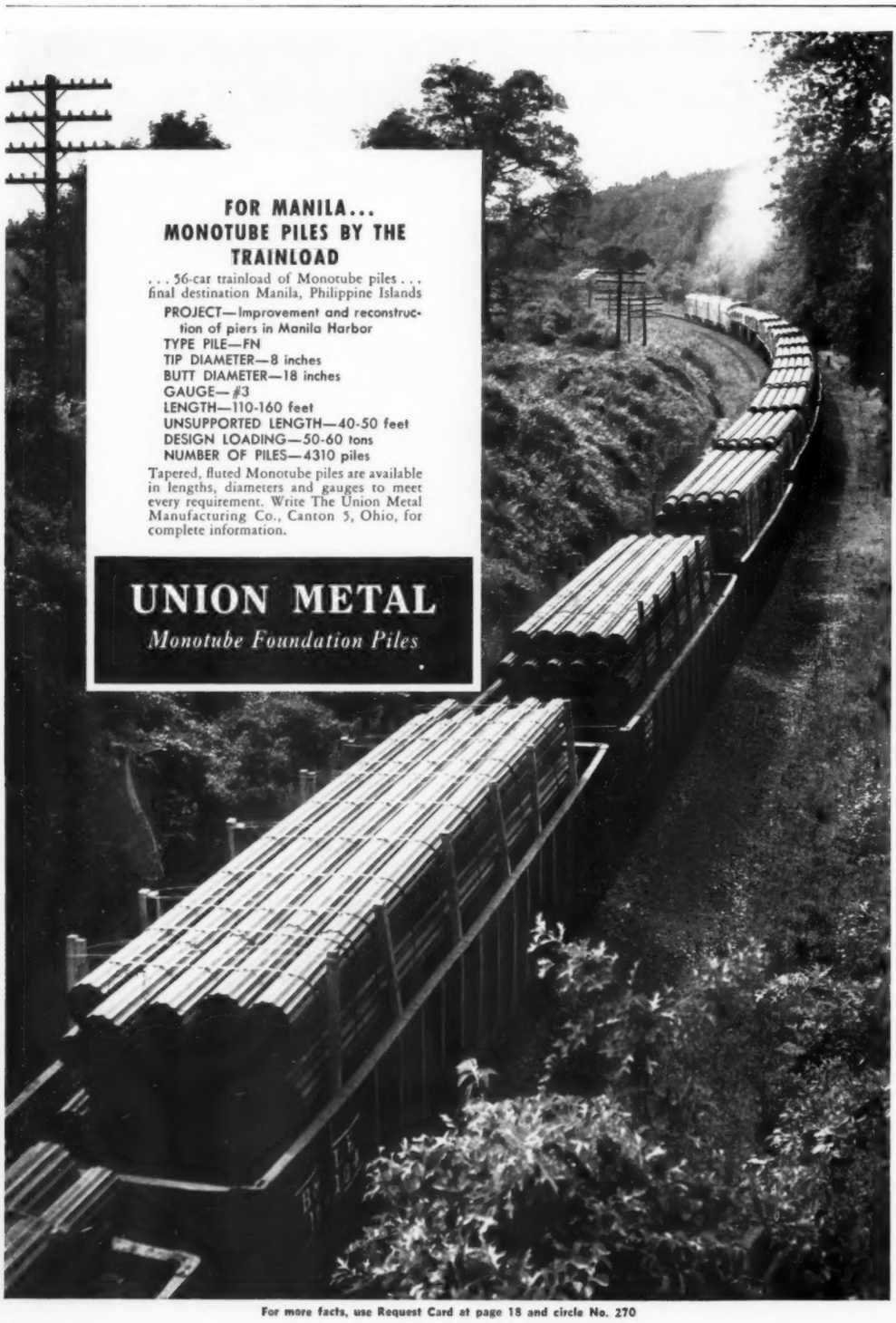
Several attractive territories are available to qualified distributors

UTICA-BEND DIVISION
CURTISS-WRIGHT
CORPORATION • UTICA, MICHIGAN

For more facts, use Request Card at page 18 and circle No. 269



Completely self-contained on a single trailer frame, this Standard Steel Model TM one-ton-capacity asphalt plant is especially designed for on-the-job mixing in rural areas and hard-to-reach locations. According to the manufacturer, it can be erected and made ready to produce asphalt mix in a few hours. The unit is also available in ½ and ¾-ton-capacity models. For further information write to the **Standard Steel Corp.**, Dept. C&E, 5087 S. Boyle Ave., Los Angeles, Calif., or use the Request Card at page 18. Circle No. 109.


FOR MANILA...
MONOTUBE PILES BY THE TRAINLOAD
. . . 56-car trainload of Monotube piles . . . final destination Manila, Philippine Islands
PROJECT—Improvement and reconstruction of piers in Manila Harbor
TYPE PILE—FN
TIP DIAMETER—8 inches
BUTT DIAMETER—18 inches
GAUGE—#3
LENGTH—110-160 feet
UNSUPPORTED LENGTH—40-50 feet
DESIGN LOADING—50-60 tons
NUMBER OF PILES—4310 piles
Tapered, fluted Monotube piles are available in lengths, diameters and gauges to meet every requirement. Write The Union Metal Manufacturing Co., Canton 5, Ohio, for complete information.
UNION METAL
Monotube Foundation Piles
For more facts, use Request Card at page 18 and circle No. 270

New portable heater has many applications

The Silent Glow Oil Burner Corp. announces the addition of the Model 450 to its line of portable heaters.

This lightweight unit, with a capacity of 450,000 Btu's per hour, is said to have a variety of applications where high velocity, high temperature air is required in large volume.

According to the manufacturer, the Model 450 is also an excellent means of drying and curing such material as cement blocks, sand, and other concrete aggregates.

The heater has no exposed flame, and automatic heat control prevents overheating. Other features include continuous ignition said to prevent flameout, spilling of fuel, smoke, and odor; and an electric solenoid valve designed to eliminate the danger caused by leaky hand valves.

The Model 450 is supported and moved by heavy-duty rubber tire wheels.

For further information write to the Silent Glow Oil Burner Corp., Dept. C&E, 850 Windsor St., Hartford 5, Conn., or use the Request Card at page 18. Circle No. 61.

Truck-tractors feature lightweight construction

A new series of Western-type International heavy-duty conventional truck models is announced by the Motor Truck Division of the International Harvester Co.

Three diesel-powered truck-tractors, designed for highway service and featuring lightweight construction, are offered in the new series. They are the four-wheel Model RD-405, rated at 30,000 pounds gvw and 68,000 pounds gcw; six-wheel Model RDF-405, and trailing-axle tandem Model RDT-405, both of which are rated at 40,000 pounds gvw and 76,800 pounds gcw.

The standard engine for all models is the Cummins HRB-600, rated at 175 horsepower. Six optional diesel engines are offered, with horsepower ratings from 190 to 335.

According to the manufacturer, a significant feature of the series is the chassis, which is said to be approximately 700 pounds lighter than previous conventional RD-line chassis models.

The RD-405 comes in 167, 179, and

191-inch wheelbases. Standard rear axle is the Timken R-160 single reduction, rated at 23,000 pounds capacity.

The RDF-405 and RDT-405 come in 167, 179, 191, 215, 227, and 239-inch wheelbases. Standard rear axle for the RDF-405 is the SQHD Timken single reduction with inter-axle differential, rated at 37,000-pounds capacity. Standard rear axle for the RDT-405 is the Timken R-160 single reduction, rated at 23,000-pound capacity, and the Timken TK-560 trailing dead axle, with a single tire pusher axle optional.

A wide variety of optional main and auxiliary transmissions, rear axles, and other components is available.

For further information write to Motor Truck Division, International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago, Ill., or use the Request Card at page 18. Circle No. 45.

Two new extensions increase saw versatility

The Clipper Mfg. Co. announces the availability of two new accessories for use on its 2-hp SuperMatic masonry saw.

Frame extensions, for both left and right-side use, can be added to the SuperMatic, making it a double or triple-width saw. These frame extensions make it possible to cut masonry materials up to 7 feet in length and even longer, the manufacturer states. This includes sills, copings, lintels, stone units, and refractory slabs.

Retractable wheels also can be added for easy, quick portability.

For further information write to the Clipper Mfg. Co., Dept. C&E, 2800 Warwick, Suite 149, Kansas City 8, Mo., or use the Request Card at page 18. Circle No. 33.

A combination rotary and down-the-hole drilling machine, this Reich Bros. Model T-750 reportedly can exert almost 40,000 pounds on the bit. In down-the-hole drilling, sensitive controls enable the operator to apply exactly the right amount of down pressure and rotation speed for maximum penetration by the hammer and bits, the company states. The rig is said to be easily operated by one man. For further information write to the **Reich Bros. Mfg. Co.**, Dept. C&E, 1439 Ash St., Terre Haute, Ind., or use the Request Card at page 18. Circle No. 31.

Here's the torque converter equipped HD-16 on the job at Tyrone Rock Quarry, located south of Atlanta, Georgia. The torque converter was the reason this firm picked the HD-16.

"Why did we buy the HD-16? Because of *torque converter drive!*"

says Pete Bradberry, Tyrone Rock Products Company

When Tyrone Rock Quarry needed a new track-type tractor, company officials made no bones about one feature the machine had to have—namely, a torque converter drive.

As Superintendent T. J. (Pete) Bradberry describes it: "We bought the Allis-Chalmers HD-16 because of the *torque converter drive.* We find the torque converter automatically matches speed and pull to load requirements and terrain conditions. Under full throttle, the engine doesn't lug down, but instead delivers maximum horsepower at all times. It saves wear and tear and is worth many times the price!"

Torque converter drives prove ideal for such applications as rock quarry work . . . for stripping overburden, stockpiling and maintaining roads. They speed work and save operating costs. They permit engines to operate in their most efficient speed range at all times . . . They match power automatically to load demands . . . providing up to 6:1 torque multiplication when required. Heavy load pick-up is smooth and even, without clutch slippage . . . for better over-all flotation.

Allis-Chalmers offers a torque converter as optional on the HD-16 Tractor and as standard equipment on the bigger HD-21. In either case, the converter components are furnished by Twin-Disc—your assurance of dependability.

All three of the leading track-type tractor manufacturers offer torque converter drives as optional or standard in certain models . . . and all three standardize on Twin Disc components. Be sure to specify a torque converter in your next machine. See for yourself how they cut costs, bring in new profits.

Twin Disc Clutch Company, Racine, Wisconsin; Hydraulic Division, Rockford, Illinois.

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

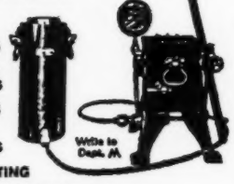
For more facts, use Request Card at page 18 and circle No. 272

DUDGEON HYDRAULIC JACKS

SALES RENTALS

CAPACITY TO 600 TONS

FOR:
PILE TESTING
UNDER-PINNING
BRIDGES
PIPE PUSHING
SOIL TESTING



Write to Dept. M

DESIGNERS and MANUFACTURERS OF

Hydraulic Units For Special Applications

RICHARD DUDGEON INC. EST. 1850

789 BERGEN STREET BROOKLYN, N. Y.
• ST 9-4040 •

For more facts, circle No. 271

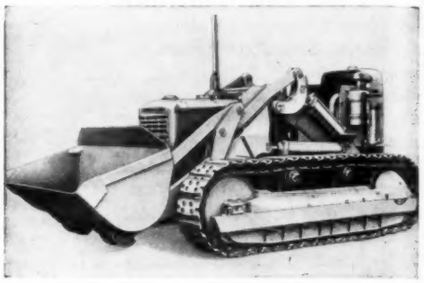
Complete drafting outfit in light, portable case

Design Pak, a complete set of precision drawing equipment in a lightweight, portable case, is offered by the Tele-Muff Co.

Said to eliminate the need of all separate drawing items such as the drawing board, T-square, triangle, holemeter, compass, and protractor, the Design Pak is a precise, smooth-running drafting machine that will remain true at any setting over the complete area of a standard 8½×11-inch drawing sheet.

Accurate vertical and horizontal scales are transparent and calibrated to 32nds for easy working. A compass with a 1 to 6-inch radius is operated by loosening the control knob, pressing the pointer at its center, and swinging the arcs by placing the pencil point in the desired radius position. The 180-degree protractor indexes and locks every 5 degrees, to 90 degrees each side of zero.

For further information write to the Tele-Muff Co., Dept. C&E, 1719 First St., San Fernando, Calif., or use the card at page 18. Circle No. 101.



The new No. 977 (Series E) Traxcavator, featuring an undercarriage of increased strength and a special low-speed transmission, is designed for severe applications.

Offer improved versions of heavy-duty loaders

Two new Traxcavators designed especially for use on severe and demanding applications are announced by the Caterpillar Tractor Co.

Designated Caterpillar No. 955 (Series E) and No. 977 (Series E) Traxcavators, the units feature special design modifications from their corresponding Series C models.

Prime feature of both new machines is a strong undercarriage, with heavy construction incorporated into all undercarriage parts, track roller frames, sprockets, front idlers, track rollers, and track carrier rollers. Besides imparting extra machine sturdiness, these features are also said to allow for high ground clearance of the units and, at the same time, a low center of gravity. Both units have hydraulic track adjusters as standard equipment.

Additional features of the No. 977 (Series E) include a 40-section track group with 18-inch flat shoes, and a special low-speed transmission. Length of track on the ground for this unit is 8 feet 10 inches.

On both models, horsepower and bucket capacity have remained the same as on their Series C counterparts.

For further information write to the Caterpillar Tractor Co., Dept. C&E, Peoria, Ill., or use the Request Card at page 18. Circle No. 8.

ROUND CONCRETE COLUMNS SUPPORT MULTI-STORIED SHOPPING CENTER

Bergen Mall Shopping Center, Route 4, Paramus, N. J. Architect: John Graham & Co., Architects Engineers, New York and Seattle. Contractor: Corbetta-Pavarini

Low cost, easy-to-handle

SONOCO SONOTUBE® Fibre Forms

Save construction time and money!

The huge new Bergen Mall Shopping center contains hundreds of round concrete supporting columns formed by Sonoco SONOTUBE Fibre Forms.

Contractors everywhere have learned that these low-cost fibre forms provide the quickest, most economical method of forming round columns of concrete.

Sonoco SONOTUBE Fibre Forms require minimum bracing, handle easily and strip quickly.

Plan now to save time and money on your next job . . . order Sonoco SONOTUBE Fibre Forms!

Sizes to 48" I.D. standard lengths to 18 ft., longer if required. Can be sawed to requirements on the job.

Use Sonoco's patented "A" coated SONOTUBE for finished columns. "W" coated also available.

See our catalog in Sweets

For complete information and prices, write

SONOCO PRODUCTS COMPANY

CONSTRUCTION PRODUCTS DIVISION

2795 HARTSVILLE, S. C.

LOS ANGELES, CAL. 5955 SOUTH WESTERN AVE. MONTCLAIR, N. J. 14 SOUTH PARK STREET

AKRON, IND. • LONGVIEW, TEXAS • BRANTFORD, ONT. • MEXICO, D. F.

sonoco "SERVES THE WOODEN" PAPER CARRIERS

REG. U.S. PAT. OFF.

For more facts, use Request Card at page 18 and circle No. 273

CAN YOU REPLACE A TRACTOR ROLLER FOR $7.00?

No? Well, for $7.00, on an average, you can rebuild a tractor roller—by hardsurfacing with a Lincolnweld Automatic Submerged Arc Welder. And it will outlast original equipment!

Lincolnweld deposits a special alloy surface which will stand hard wear for a long time. This deposited surface is so smooth that no machining is required.

If maintenance of earth moving equipment is your problem it will pay you to investigate the advantages of Lincolnweld Automatic Submerged Arc Welding.

CONTRACTORS! Write for Bulletin SB-1355 giving detailed information about Lincolnweld Automatic Welders.

LINCOLN

THE LINCOLN ELECTRIC COMPANY

Dept. 5319 Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

For more facts, use Request Card at page 18 and circle No. 274

New truck line features wide choice of engines

Increased power, greater load capacities, added driver comfort, larger brakes, and a new automatic transmission are among the outstanding features of 1958 Dodge trucks, the company announces.

The new truck line offers engines with 10 different horsepower ratings ranging from 113 to 234. Maximum gvw on the 1958 models range from 5,100 to 46,000 pounds, and gross combination weights range to 65,000 pounds.

A 6-speed Torqmatic transmission provides automatic shifting in the medium and high-tonnage models. A special feature of the Torqmatic transmission is the hill retarder, a safety device that assists downhill braking to lengthen brake life. New and more effective hydraulic brakes add increased stopping power to medium and high-tonnage models.

A new engine—the 207-hp Super Power Giant 315—is standard on the C600 cab-over-engine model, and is available on most other medium-tonnage models. According to the company, gross combination weights have been increased as much as 10,000 pounds on tandem models.

For further information write to the Dodge Division, Chrysler Corp., Dept. C&E, Detroit 31, Mich., or use the Request Card at page 18. Circle No. 70.

One in the newly announced 1958 line of Dodge trucks, this Model T700 is powered by a 218-hp V-8 engine. A 5-speed heavy-duty synchro-shift transmission in combination with a 3-speed auxiliary transmission affords maximum flexibility for both on and off-the-road operations.

Offer new air compressor in intermediate size

Atlas Copco Eastern, Inc., announces the addition of a new intermediate-size air compressor, the AR-3, to its stationary compressor series. The new model has a free air delivery ranging from 570 to 680 cfm at 100 psi and is available either for permanent installation or as a skid-mounted unit.

According to the company, despite its substantial capacity, the AR-3 is designed for use either as a permanently installed unit or on a fully stabilized skid mount; and its reduced weight and maximum operational balance permit permanent installation on a relatively light foundation.

Space requirement for the unit is said to be as much as 25 per cent less than that required for many other machines with comparable free air delivery.

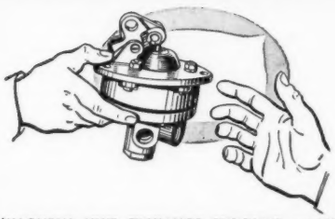
Further economies stem from the AR series' special heat recovery systems which can convert up to 60 per cent of the machines' total power input into hot water for space heating and washing purposes, the manufacturer reports.

Weighing 5,400 pounds, the AR-3 draws 600 gallons of cooling water per hour at 60 degrees F. The new compressor measures 60 inches deep, 41 inches wide, and 72 inches high.

For further information write to Atlas Copco Eastern, Inc., Dept. C&E, 151 Linwood Ave., Paterson, N. J., or use the Request Card at page 18. Circle No. 54.

if costs have you perplexed...

HERE'S NEWS ABOUT WAGNER AIR BRAKES THAT CAN SAVE YOU MORE MONEY AND TIME!



WAGNER'S UNIT EXCHANGE PROGRAM establishes exact replacement costs *before* exchanges are made.

WAGNER UNIT REPAIR KITS provide all replacement parts commonly needed . . . eliminate need for extensive inventory.

Wagner's *Unit Exchange Program* and *Repair Kits* are both offered to help you lower your overhead and reduce repair and maintenance time.

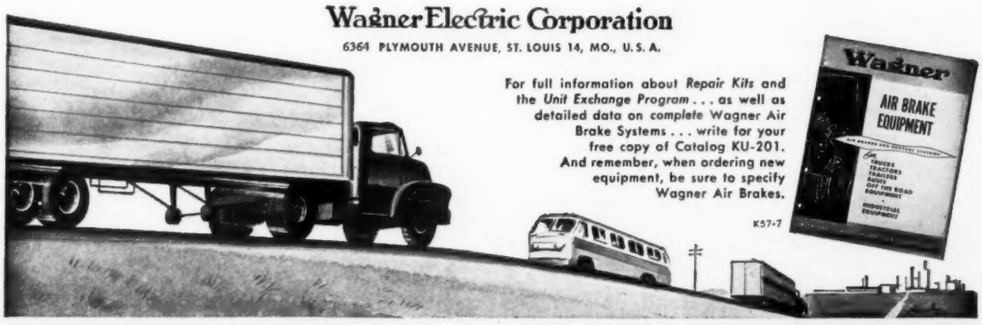
Wagner Air Brake *Exchange Units* carry the same guarantee as new Wagner Air Brake Equipment, but cost much less. Low flat rates have been established for exchange units which are to replace units needing major overhaul and for those requiring minor overhaul. With these two flat rates, you know the exact cost of replacement *before* an exchange is made. Included in this *complete* Exchange Program are compressors, application and actuation valves, and other units from Wagner's extensive line of air brake components.

Routine air brake system repairs are easily handled in your own shop with Wagner Air Brake *Repair Kits*. These kits contain all the parts commonly needed to keep equipment in "like new" operating condition. Because no oversize or undersize parts are needed, the Repair Kit Parts have wide interchangeability. This cuts your investment in inventory and reduces shelf space requirements.

Wagner serves your every air brake need through a vast network of qualified Wagner Air Brake Distributors supplied by 24 Wagner Branch Offices located in principal cities in the United States and Canada.

Wagner Electric Corporation

6364 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.

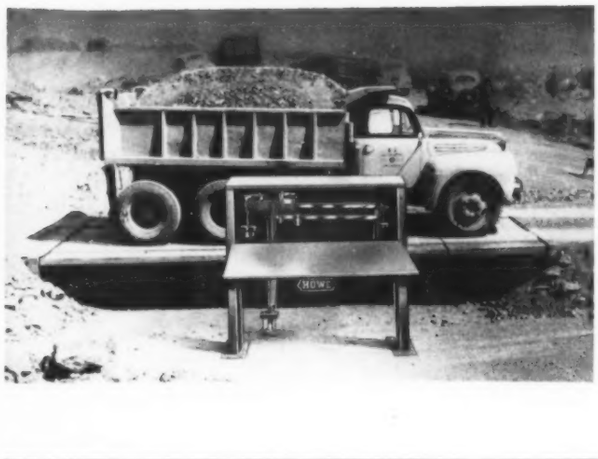


For full information about *Repair Kits* and the *Unit Exchange Program* . . . as well as detailed data on *complete* Wagner Air Brake Systems . . . write for your free copy of Catalog KU-201. And remember, when ordering new equipment, be sure to specify Wagner Air Brakes.

K57-7

LOCKHEED HYDRAULIC BRAKE PARTS and FLUID • NoRoL • CoMoX BRAKE LINING • AIR BRAKES • AIR HORNS • TACHOGRAPHS • ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES

For more facts, use Request Card at page 18 and circle No. 275



Portable vehicle scales in capacities to 70 tons and lengths to 60 feet are available from the Howe Scale Co. According to the firm, additional scale sections can be joined for greater length and capacity, with the operation requiring only 9 standard bolts. No pit is needed for installations, which permits the scales to be relocated as the job requires. A wide selection of weight indications and recording devices is available. For further information write to the **Howe Scale Co.**, Dept. C&E, 2951 Scale Ave., Rutland, Vt., or use the Request Card at page 18. Circle No. 74.

Snow-blower attachment for tractor shovels

A snow blower for use with Clark's Michigan Models 75A, 125A, and 175A tractor shovels is available from Krause Industries. Called the Sno-Thro blower, the unit is mounted on the same pins as the standard bucket and can be hooked up or detached in minutes, the company reports.

The weight of the unit is said to be less than a heaped bucket, thus preventing undue strain on the boom arms. It works in heavy wet snow, as well as in dry snow, and heavy windrowed snow reportedly can be loaded into trucks at a rate of 12 cubic yards per minute.

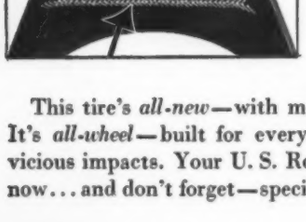
The Sno-Thro's rotor is 38 inches in diameter, weighs 150 pounds, and turns at about 400 rpm. According to the manufacturer, clean loading results because it is not necessary to break the snow into very fine particles, nor to create a turbulence.

The unit is available with two different type hoods. One has a 360-

Cut Job Delays . . . Cut Job Costs

with exclusive SAFETY STEEL SHIELD

SEE these thousands of *flexible steel cords* between tread and Super Royalon body. This patented Safety Shield, *invulnerable* to cuts and ruptures, prevents tire failure in the tread area . . . cuts job delays and job costs 'way down!



U.S. ROYAL Super FLEETMASTER

This tire's *all-new*—with money-saving advances throughout its construction. It's *all-wheel*—built for every on-and-off-the-road truck exposed to the most vicious impacts. Your U. S. Royal Dealer has it in sizes through 11.00. Call him now . . . and don't forget—specify "Super Fleetmaster" on the new trucks you buy!

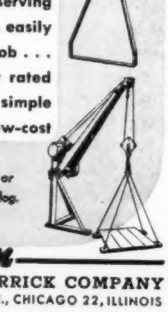
US RUBBER United States Rubber

Rockefeller Center, New York 20, N. Y. In Canada: Dominion Rubber Co., Ltd.

For more facts, use Request Card at page 18 and circle No. 276

Sasgen

Derricks Hoists Winches



Over 50 years serving contractors . . . easily rigged on the job . . . conservatively rated for safety . . . simple in design . . . low-cost maintenance.

See your dealer . . . or write for latest catalog.

Sasgen DERRICK COMPANY

3127 W. GRAND AVE., CHICAGO 22, ILLINOIS

For more facts, circle No. 277

The Sno-Thro blower for use with Clark's Michigan Models 75A, 125A, and 175A tractor shovels is mounted on the same pins as the standard bucket and can be hooked up or detached in minutes. It works in heavy wet snow, as well as in dry snow, and reportedly can load heavy windrowed snow into trucks at a rate of 12 cubic yards per minute.

degree rotation which is reversible and can be controlled from the cab. The other is manually controlled. The manually controlled chute can be taken off or faced to either side quickly and easily. When clearing highways—and not loading trucks—the top chute section can be removed and the snow thrown greater distances from the road.

Models come in 6 or 7-foot widths, powered by Wisconsin 31 to 56-hp air-cooled engines.

For further information write to Krause Industries, Dept. C&E, 1205 Warren St., Baraboo, Wis., or use the Request Card at page 18. Circle No. 79.

Materials hoist designed for steel scaffolding

A new materials-handling hoist for use with steel scaffolding is announced by the Universal Mfg. Corp. Designated Scaf-O-Matic, the unit is rated at a 750-pound capacity, and can be erected in only 25 minutes by two men, the manufacturer reports.

The unit consists of a tower, platform or materials cage, mast cat head, mast base, hoist blocking member, and the hoist itself—and features a Briggs & Stratton air-cooled, 4-cycle, 9-hp gas engine with winch drum and controls. The 14-foot hoist blocking member is said to eliminate the need for wood blocking, and to position the hoist parallel to the scaffold run, keeping the hoist operator well out from under the load. The tower comes in 6½-foot sections; it may be erected all at once or as scaffolding is heightened.

For more data on any item, circle indicated number on card at page 18.

The Scaf-O-Matic also features a platform said to rotate smoothly and effortlessly through a full 180 degrees, bringing the load from outside the tower onto the work platform.

For further information write to the Universal Mfg. Corp., Dept. C&E, 133 North St., Zelienople, Pa., or use the Request Card at page 18. Circle No. 32.

Drafting tables feature standardized base sizes

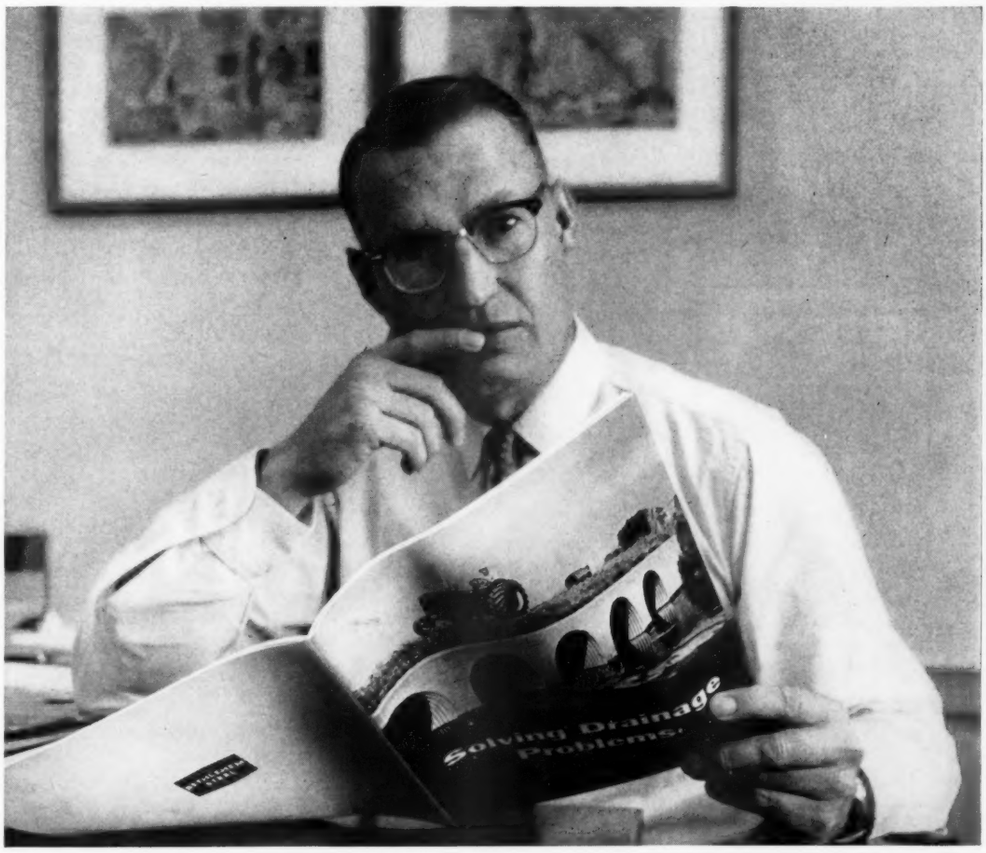
Two new additions to its line of Anco-Bilt drafting tables are announced by Anco Wood Specialties, Inc.

Constructed of wood and steel, respectively, the new models feature standardized table base sizes, with boards of varying sizes available.

Other features of these Anco tables include fingertip lever adjustment of the board's working angle to 90 degrees vertical, and a print drawer the full width of the base, which may be inserted from either front or back and be locked in either position.

The base is said to permit easy adjustment from 37 to 43½ inches.

For further information write to Anco Wood Specialties, Inc., Dept. C&E, 71-08 80th St., Glendale 27, N. Y., or use the Request Card at page 18. Circle No. 105.



How long have you waited for a book like this?

Now Bethlehem has gathered, into less than a hundred well-illustrated pages, a world of worthwhile engineering information on the problems of drainage and drainage materials which any engineer, contractor, or township official can put to good use.

Much of this material has never been made generally available before, and never have so many down-to-earth, practical data been assembled under one "roof." This book is simply loaded with usable tables, charts, nomographs, and factual information.

As you may know, Bethlehem does not make culvert pipe. But we do make Beth-Cu-Loy corrugated galvanized sheets for pipe fabricators. If you have not already been given a copy of our book by your fabricator, we shall be glad to send you one. The coupon is for your convenience. Clip it and mail it today.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

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Room 1041
Bethlehem, Pa.

Please send me a copy of Booklet No. 425 "Solving Drainage Problems" along with the names of fabricators near me.

Name_____ Title_____

Address_____

City and State_____

BETHLEHEM STEEL

BETHLEHEM STEEL

For more facts, use coupon, or Request Card at page 18 and circle No. 278

The Austin Powder Co.'s Model 800 portable explosives magazine has an 8,000 to 10,000-pound capacity, and can be hauled by a light truck or tractor. A fifth wheel-type front axle assures maximum maneuverability at all times.

New portable magazine aids in blasting work

A portable explosives magazine that can be hauled by light truck or tractor to the job site to facilitate blast hole loading is announced by the Austin Powder Co.

Designated Model 800, it has capacity for 8,000 to 10,000 pounds of explosives, detonating fuses, and caps. Loading and unloading are said to be simplified by five large doors, two of which are located on either side, with one at the rear.

An important feature of the 800 is the fifth-wheel-type design of the front axle, which is reported to assure complete maneuverability even in close quarters. Arched tubular construction of front and rear axle provides ground clearance and strength necessary over rough terrain.

According to the company, the magazine is constructed of welded steel throughout and separated into 2 compartments. The sides and top are wood lined, while the floor is covered with masonite.

The unit has an over-all body length of 14 feet, is 6 feet 4 inches wide, and 46½ inches high.

For further information write to the Austin Powder Co., Dept. C&E, Rockefeller Bldg., Cleveland 13, Ohio, or use the Request Card at page 18. Circle No. 26.

New survey monument features adjustable top

A survey monument said to eliminate the need of digging and raising monuments to new road levels is offered by the Charles Bruning Co., Inc.

Designated Mark-One, the monument features an adjustable top that permits it to be easily and quickly brought to the new level without loss of accuracy of survey points, the company reports.

The monument is designed for use in new or old concrete, as well as macadam and other hard surfaces. Points on a resurfaced road are monumented by turning the adjusting screw of the established monument to the new surface level and adding spacers. Up to 4½ inches of spacers can be added as required.

According to the manufacturer, the Mark-One is made of brass that will not oxidize or corrode even under extreme road conditions. A 14-inch pipe extends from the monument body into the subgrade of the road below, assuring a firm and permanent anchor.

For further information write to the Charles Bruning Co., Inc., Dept. C&E, 4700 Montrose Ave., Chicago 41, Ill., or use the Request Card at page 18. Circle No. 103.

Desk-top office machine protects business papers

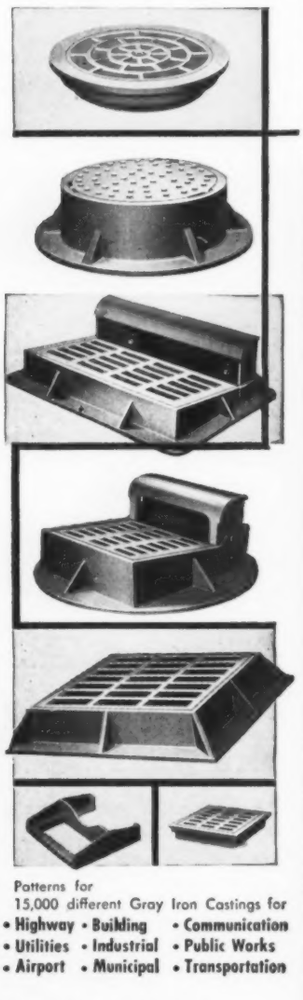
A desk-top office machine that protects, preserves, and beautifies important business papers is announced by the American Photocopy Equipment Co.

Designated Apeco Ply-On Laminator, the machine completely encases

Neenah FOUNDRY COMPANY

construction castings

of sound quality... solid value



Patterns for 15,000 different Gray Iron Castings for

• Highway • Building • Communication
• Utilities • Industrial • Public Works
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Write for our 135-page Catalogue "R," Second Edition

Neenah FOUNDRY COMPANY
NEENAH, WISCONSIN CHICAGO OFFICE
5445 North Nova Ave.
Chicago 31, Illinois

For more facts, circle No. 279

INTRODUCING THE

miller GOLD STAR 300 SERIES

GREAT NEW AC-DC ADDITION TO THE MILLER LINE

Here is the finest in inert gas and metallic welding

Complete particulars sent on request

miller ELECTRIC MANUFACTURING CO., INC.
APPLETON, WISCONSIN

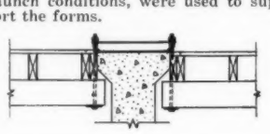
distributed in Canada by CANADIAN LIQUID AIR COMPANY, Ltd., Montreal

For more facts, use Request Card at page 18 and circle No. 280

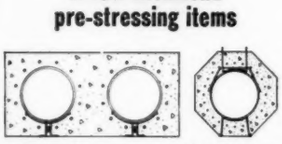
Pre-stressed

Tully & Di Napoli, contractors

Long, pre-stressed concrete girders support the deck of this bridge at Idlewild Airport, New York, designed by the Port Authority. Deck was engineered by Precrete, Inc. Richmond Free-Fit Offset Hanger Frame-Tys, easily adjustable for various slab heights and haunch conditions, were used to support the forms.

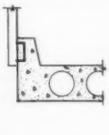


A few Richmond pre-stressing items



Chairs for support and hold-down of cardboard tubing in pre-stressed beams and piles.

Spacers for spirals of pre-stressed piles.



Inserts for railing-in pre-stressed slab bridges.

The increasing use of pre-stressed concrete presents numerous problems to contractors. Richmond's Technical Division is ready to assist you. If you have a problem, write to RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N.Y. or 315 South Fourth St., St. Joseph, Mo.

For more facts, circle No. 281

either or both sides of an original copy with thin, pliable sheets of transparent cellulose triacetate plastic film, with the full operation taking less than 10 seconds.

According to the firm, the plastic coating is impervious to moisture, retains its clarity with age, will not crack when folded, resists most liquids and solvents, and adds contrast and brilliance to the original copy.

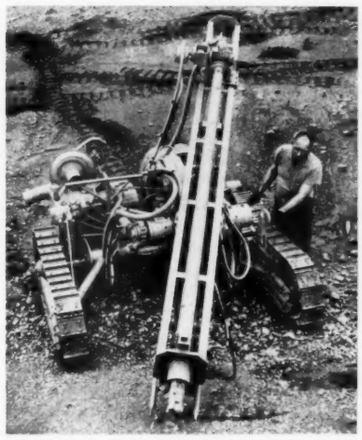
Occupying only 10½×15 inches of table space and weighing less than 30 pounds, the Laminator is activated either by push button or foot pedal. It operates on either continuous or single feed.

The machine has a film capacity for two 1,000-foot rolls, and functions on standard electrical power with a third cord for grounding.

The manufacturer points out that lamination adds to the appearance of bids, quotations, and estimates, as well as preventing the alteration of any figures. Another suggested application of the machine is the enhancement of drawings and photographs of homes for showing to prospective buyers.

For further information write to the American Photocopy Equipment Co., Dept. C&E, 1920 W. Peterson Ave., Chicago 26, Ill., or use the Request Card at page 18. Circle No. 112.

Capable of drilling 4-inch-diameter blast holes as high up as 7 feet or as close as 9 inches to the ground, this Reich Bros. Model 150 blast-hole driller can also swing in a 150-degree arc both horizontally and vertically. Supporting the drill at the drive end is a standard hollow-shaft Cone-Drive speed reducer, which also drives the drill from a hydraulic motor. The Model 150 is self-propelled on its own standard crawler tracks. For further information write to the **Reich Bros. Mfg. Co.**, Dept. C&E, 1439 Ash St., Terre Haute, Ind., or use the Request Card at page 18. Circle No. 40.



FOR SAFE AND SPEEDY HOISTING

Heavy construction calls for heavy-duty blocks and MADESCO blocks combine the performance features developed through 30 years of specialized engineering for the construction field. Heavy steel shells and fittings, heavy iron or steel graphite-bronze, self lubricating sheaves are grooved to give you the maximum return for your rope investment. Sheaves equipped with bronze or anti-friction bearings for easy operation and long service.

Our special service departments will help you with their recommendations. Write for our catalog or consult your equipment dealer who can supply you with MADESCO products.

MADESCO TACKLE BLOCK CO.
EASTON, PA.

MADESCO BLOCKS

Engineered to Serve Your Special Service Needs

For more facts, circle No. 282

Rough Going Doesn't Faze Gorman-Rupp Lightweight Pumps

Mud and frozen chunks of dirt won't stop this pump. It's a Gorman-Rupp "80" Series. Straight-in suction delivers liquid directly to the impeller's eye. No entrance restrictions. No check valve. Capacity, efficiency and suction lift are increased.

Gorman-Rupp "80" Series Centrifugal Pumps prime and reprime at lifts up to 30 feet. They are easily moved from location to location because of lightweight, aluminum construction. (The Midget weighs only 48 pounds.)

Available in four models:

Midget, 1½", 6,500 GPH, 2.25 HP
Pelican, 2", 8,500 GPH, 2.75 HP
Hawk, 2", 12,000 GPH, 5.5 HP
Eagle, 3", 18,000 GPH, 6.8 HP

Ask your Gorman-Rupp Distributor for a demonstration.

NEW PRIMING PRINCIPLE
introduced at the Road Show

PUMP AT REST—Captured liquid retained for priming. Note absence of usual check valve.

PRIMING ACTION—Entrained air (B) escapes at (A) to be discharged. Priming liquid returns (C) to entrain more air.

PUMPING ACTION—Straight-in suction voids entrance restrictions. Water enters direct to the eye of the impeller.

THE GORMAN-RUPP COMPANY

305 Bowman Street • Mansfield, Ohio

For more facts, use Request Card at page 18 and circle No. 283

Asphalt and tar kettle burners run on LP gas

New Flamegas asphalt and tar kettle burners designed to operate on LP gas are available from the Flamegas Detroit Corp.

Based on 30-pound pressure settings, these new units reportedly will deliver 500,000 Btu's per hour per burner, and may be adjusted downward by reducing the pressure at the adjustable regulator.

According to the manufacturer, Flamegas burners operate on either 6 or 12 volts, or may be operated from the stand-by battery that is included with each burner assembly.

Safety features include an automatic shut-off of the fuel supply to the burners in the event of pilot light or electrical failure. An automatic temperature control eliminates overheating.

These new compact and portable units are available with either single or double burners. They can be mounted, the company reports, in tank trucks, portable tanks, or kettles, quickly and easily.

Attachments for a wide variety of heating applications are available.

For further information write to the Flamegas Detroit Corp., Dept. C&E, 12901 Auburn Ave., Detroit 23, Mich., or use the Request Card at page 18. Circle No. 100.

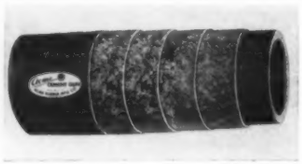
Automatic line oiler protects air tools

An automatic line oiler which shuts off the air supply when the oil is used up is offered by the Le Roi Division, Westinghouse Air Brake Co.

Designated Model L0380, the new oiler reportedly is light in weight, easily adjusted, and can be refilled while in use. The positive type oil-pickup feeds oil the instant drilling starts; the moment the oil supply is exhausted, the air supply to the air tool is shut off automatically.

According to the manufacturer, the unit is easy to assemble or disassemble without special tools.

For further information write to the Le Roi Division, Westinghouse Air Brake Co., Dept. C&E, 3716 W. Wisconsin Ave., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 60.



Tough new hose handles sand and cement mixtures

Its new line of hose for handling sand and cement mixtures is announced by the Acme Mfg. Co., a division of the Acme-Hamilton Mfg. Corp.

The Acme cement gun hose uses include spraying wet and dry cement on walls, reinforced wire structures, and dam facings. For these guniting applications, the hose is designed to withstand working pressures from 100 to 150 psi, according to the manufacturer.

Made with a ¼-inch-thick pure gum tube, a carcass consisting of four plies of wrapped duck, and a friction fabric cover, Acme cement gun hose is available with either a static wire or a static conducting tube to handle the static electricity generated by guniting applications.

Four sizes of the hose, ranging from 1 through 2-inch ID, are available. The weights of these sizes range from 84 to 159 pounds per 100 feet.

For further information write to the Acme Rubber Mfg. Co., Division of Acme-Hamilton Mfg. Corp., Dept. C&E, 115 Meade St., Trenton 3, N. J., or use the Request Card at page 18. Circle No. 22.

Front-end power takeoffs offered for truck mixers

A complete line of front-end power takeoffs for use with truck mixers is available from The Transmission & Gear Co.

The Model RT-632 features a hydraulically-actuated clutch running in oil which permits disengaging the mixer at any time. This model is operable from within the truck cab.

Model RT-632-A has the same general construction as the RT-632 ex-

INTERNATIONAL six-wheelers cover the range from 22,000 lbs. GVW to 76,000 lbs. GCW in conventional and COE design. There is one practically custom-built for every hauling job in the world's most complete truck line. Widest choice of load-moving and load-carrying components to keep operating and maintenance cost lowest.

Here's a unique double-duty vehicle—the new INTERNATIONAL Travelette! Seats six big people comfortably in two full-width seats! Hauls up to a full ton load in all-steel 6-ft. pickup body. Service-utility body and four-wheel-drive models available.

INTERNATIONAL TRUCK

cept that it incorporates a manually shifted gear-tooth-type coupling for engaging and disengaging the mixer drive.

The third unit, Model RT-632-B, has no disconnecting means in the front-end power takeoff proper.

In addition to being designed for installation as original equipment, the new units are recommended for replacement use, and will fit any make or model of truck, according to the firm.

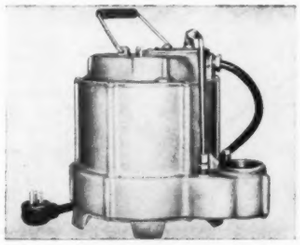
For further information write to The Transmission & Gear Co., Dept. C&E, 10421 Haggerty Ave., Dearborn, Mich., or use the Request Card that is bound in at page 18 of this issue. Circle No. 14.

Design changes announced for submersible pump

Several new design improvements on its new Kenco Model 110 submersible pump are announced by the Kenco Pump Division of The American Crucible Products Co.

The unit's capacity has been increased to 5,000 gph at a 10-foot head, with a 30-foot shut-off head.

Completely submersible, this new Kenco pump is engineered for a wide variety of sump applications, and with



the new design the liquid level control switch is now built into its watertight top. Actuated by rising water which compresses air to flex a nylon-neoprene diaphragm, this control switch needs no adjustment, has no floats, weights, or wires, the manufacturer reports.

The Model 110 pump is available with any of three controls: non-automatic for installations requiring continuous or separately controlled operation; fully automatic, easily adjusted for varying operating conditions; and manual-automatic for portable applications where manual starting is desired with automatic stopping assured.

For further information write to the Kenco Pump Division, The American Crucible Products Co., Dept. C&E, 1305 Oberlin Ave., Lorain, Ohio, or use the Request Card at page 18. Circle No. 16.

Warning light stabilizer aids trucks when dumping

A gravity-stabilized swivel bracket, designed to make its Beacon Ray and Fireball emergency warning lights more effective when installed on cinder, salt, and other dump trucks with raised bodies, is announced by the Federal Sign & Signal Corp.

According to the manufacturer, the new device features a swinging, counter-balanced metal weight that prevents the light from tilting regardless of the angle of the truck or its body. Thus, with the swivel bracket, emergency lights can be mounted on top of the forward wall of the body for warning protection from all directions.

Two types of brackets are available: Model 417-A for use with the larger and heavier Beacon Ray light, and Model 4FB-A, a more compact bracket made for the portable Fireball.

For further information write to the Federal Sign & Signal Corp., Dept. C&E, 8700 S. State St., Chicago 19, Ill., or use the Request Card at page 18. Circle No. 106.

Compact new electric set rated at 160 kilowatts

A new electric set combining high output and compactness is announced by the Caterpillar Tractor Co.

Designated Cat D375 spark-ignition electric set, the unit is available with either the new self-regulated constant voltage Cat generator or an optional two-bearing generator, and is rated at 160 kilowatts.

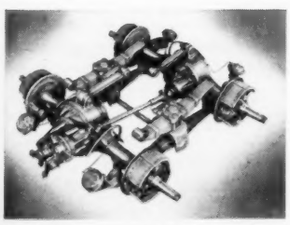
Power for the set is provided by the V-type, D375 diesel engine, equipped with simple alterations for fuel carburetion and magneto ignition system, and allowing the set to operate on methane, butane, propane, or field gases.

The new unit is available with either of two engine compression ratios—10 to 1 for use with methane gases, or 7.5 to 1 for butane, propane, or field gases. It also may be easily converted for diesel operation, whenever necessary.

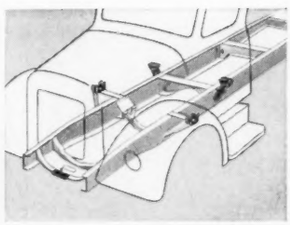
For further information write to the Caterpillar Tractor Co., Dept. C&E, Peoria, Ill., or use the Request Card at page 18. Circle No. 10.

Longer Tandem Life

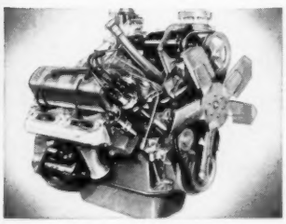
Just one reason why contractors find International Trucks cost least to own!



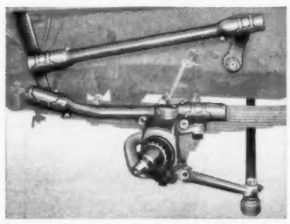
Pull through rugged off-highway terrain. Sturdy, long lasting tandem has extra flotation, positive traction always.



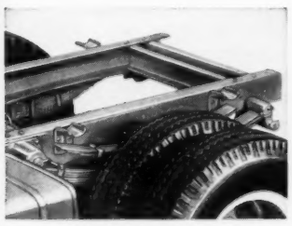
Cabs last longer even in the most severe operations with exclusive 5-point mountings. Quieter, easier riding.



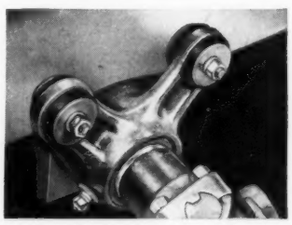
Save time, save money with the most powerful V-8's you can get—to 257 hp. Other power plants up to 356 hp.



Easy to handle even in tightest spots with true geometric steering, cam and roller-mounted steering gears.



Plenty of strength for toughest jobs, biggest loads with frames that have extra rigidity and proper flexibility.



End service costs and maintenance with rubber mounted, sealed and shielded "silent spin" center bearings.

Tough off-highway construction jobs require tandems and all other parts that are built to stand up and take it . . . that will keep operation and maintenance costs 'way down.

And that's the way INTERNATIONALS are built. Cost records prove* this all-important fact—INTERNATIONAL Trucks cost *least* to own.

This superiority doesn't just happen. It's the result of INTERNATIONAL's rigid policy to build trucks that will do the job better, do it longer and at least cost.

Why not follow the lead of men who know truck costs to the penny, men who have made INTERNATIONAL six-wheelers the sales leader for the past 22 straight years. Make your next truck an INTERNATIONAL.

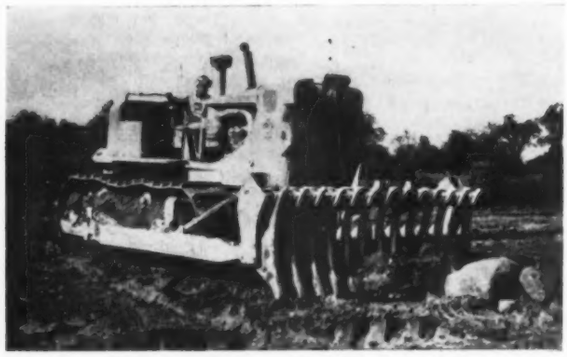
**Signed statements in our files from fleet operators throughout the U.S., back up this statement.*

cost least to own!

INTERNATIONAL HARVESTER COMPANY, CHICAGO

Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

For more facts, use Request Card at page 18 and circle No. 284



One of a complete new line of land-clearing rakes, this Rockland Model RF-3 heavy-duty rock rake is shown mounted on an Allis-Chalmers HD-21 tractor. New designs permit immediate and easy adjustment and/or addition of teeth in the field. The company claims that debris will not become hung up between rake teeth, a major cause of time-loss in land clearing. For further information about these rakes, write to the **Rockland Allied Equipment Co.**, Dept. C&E, 3778 W. Colonial Drive, Orlando, Fla., or use the Request Card at page 18. Circle No. 6.

ANNOUNCING
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CYANAMID'S
NEW LOW-COST
CAP-SENSITIVE
DYNAMITE

Only an electric blasting cap is needed to detonate this new Cyanamid explosive! Has a high density... and very good water resistance—all important features in an explosive for the construction, coal stripping and quarrying industries.
CYADYN also is finding wide use as an effective primer for low-cost blasting agents.
CYADYN comes in spiral-wrap cartridges of heavy cardboard for easy handling and loading into the blast hole. It has a stick count of 120 in 1¼″ x 8″... and is available in 4″, 4½″, 5″, 5½″, 6″ x 25# and 7″, 8″, 8½″ x 50#.
For CYADYN and other high-grade blasting materials and accessories, just contact your Cyanamid Representative. Cyanamid plants and magazines are conveniently located for quick delivery direct to your operation.

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PRODUCTS: High Explosives · Permissibles · Blasting Agents · Blasting Powder · Blasting Caps · Electric Blasting Caps · Seismograph Explosives · Blasting Accessories

*Trademark

For more facts, use Request Card at page 18 and circle No. 285

Useful measuring device in prestressing concrete

The Dynamometer, a device said to provide a more exact and simple method of prestressing wire or cables on a pretensioning bed by taking direct strain measurements in psi, rather than strain measurements in inches of elongation, is offered by W. C. Dillon & Co., Inc.

In practice, the instrument is placed between the jack and the strand; when tension is applied, its psi measurement registers on a large, easy-to-read meter.

The manufacturer points out that in addition to making optimum use of the stressing members by exact measurements, the Dynamometer eliminates the necessity of the costly supervision generally required when elongation measurements are made on strands of considerable length.

The instrument is said to be of equal value in post-tensioning operations.

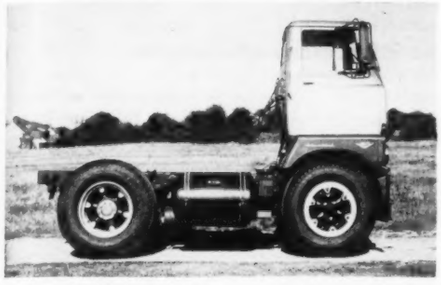
For further information write to W. C. Dillon & Co., Inc., Dept. C&E, 14620 Keswick St., Van Nuys, Calif., or use the Request Card at page 18. Circle No. 77.

New truck-tractor line has short BBC dimension

A new line of International cab-over-engine truck tractors featuring a 48-inch bumper-to-back-of-cab dimension for maximum payloads is announced by the Motor Truck Division of the International Harvester Co.

Designated Sightliner models, these new trucks are offered in the ACO-190, -200, and -220 series; are available in gvw ratings from 24,000 to 30,000 pounds; and come in five wheel bases: 98, 104, 116, 128, and 140 inches. They are powered by International heavy-duty V-8 gasoline or LPG engines, and reportedly will be available with diesel power at an early date.

Controls and instruments are conveniently arranged, and the steering wheel is positioned for maximum operator comfort and control. The driver is seated high enough to see over most vehicles, while two windows below the windshield permit him to see the road



The new I-H Sightliner series is designed to permit the transport of maximum payloads, in weight or bulk, within legal limitations. Dimension from bumper to back of cab is 48 inches.

area immediately in front of the truck.

Easy accessibility to the engine is provided by an electrically controlled, hydraulic tilt-cab feature.

Sleeper cab, power steering, a wide range of transmissions and rear axles, and a selection of springs are among the options available.

For further information write to the International Harvester Co., Motor Truck Division, Dept. C&E, 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 104.

Standard form panels provide concrete chute

A simple method of providing a combination pouring pocket and concrete chute by using standard items is announced by the Universal Form Clamp Co.

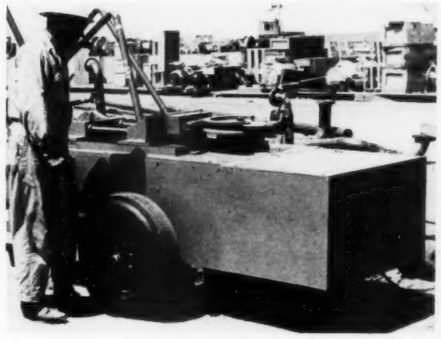
According to the company, the standard Uni-Form panel quickly be-

comes a chute when tilted into position and secured with bolts to adjustable pilaster forms. After a pour is made, the bolts are removed and the form is pushed back into place.

For further information write to the Universal Form Clamp Co., Dept. C&E, 1238 N. Kostner Ave., Chicago 51, Ill., or use the Request Card at page 18. Circle No. 12.

For more facts on these products, circle the indicated number on the Request Card at page 18.

This portable pipe bender available from the Fornaciari Co. is bending 2-inch high carbon, double-extra-heavy pipe to 180 degrees with practically no distortion. Mounted on two wheels, and designed as a fully housed trailer measuring approximately 4×10 feet, the unit makes possible the measuring, fitting, and installation of pipe right on the job site. According to the manufacturer, it is capable of accurate bends, and repeat bends, on 3-inch high carbon pipe. For further information write to the **Fornaciari Co.**, Dept. C&E, Los Angeles, Calif., or use the Request Card at page 18. Circle No. 107.



For the man who has everything

... he'll prefer the new Le Roi Newmatic Air Tools to any other package. They'll warm your worker's heart at X-mas time — and provide a holiday spirit on-the-job all the rest of the year, too!

Every Le Roi Newmatic Air Tool is a prime power pal — air-cushioned for less jarring, longer tool life; balanced for easier handling with less fatigue; precision-constructed for efficient, economical operation with low oil and air consumption. See the complete line of these low-cost tools at your local Le Roi distributor's — or write to the Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wisconsin.

LE ROI NEWMATIC AIR TOOLS

AT-710

PORTABLE AND TRACTAIR® AIR COMPRESSORS • STATIONARY AIR COMPRESSORS • AIR TOOLS

For more facts, circle No. 286→

Scoopmobile loaders of the LD Series offer many advantages including a non-rigid frame; 4-wheel-drive, steering, and brakes; and interchangeable planetary drive gears. The Model LD12 AD offers a rated capacity of 4¾ cubic yards. The Model shown is the LD8 A.

New rig in loader line offers many advantages

A 4¾-yard-rated-capacity loader is offered by Mixermobile Mfrs., Inc.

Designated Scoopmobile LD12 AD, the unit's many features include 4-wheel-drive, steering, and brakes; power steering; interchangeable axles and planetary drive gears; and a non-rigid frame.

Powered by a Cummins Model JT6B 6-cylinder, 175-hp diesel engine, the Scoopmobile offers three travel speeds in forward and reverse.

According to the firm, the unit has a maximum dumping height of 10 feet at a 45-degree angle, as well as an approximately 20-degree boom-and-bucket swing for lateral spotting without moving the machine.

Attachments including a hydraulically controlled 6-foot crane boom, backfill blade, swivel-type concrete hopper, and scarifier are available.

For further information write to Mixermobile Mfrs., Inc., Dept. C&E, 8027 N. E. Killingsworth St., Portland 20, Oreg., or use the Request Card that is bound in at page 18. Circle No. 30.

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Once again DTA* proves their leadership with "TRI-METRIC PROCESS", the new, exclusive development that guarantees you the finest quality diamond grit fused with the proper bond grading, concentration and depth of diamond section. Test check and convince yourself that DTA* Diamond Concrete Cutting Blades give you better, faster, freer cutting and longer blade life!

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DTA* Concrete Cutting Machine

The best combination for better concrete cutting... DTA* Concrete Cutting Blade and Concrete Cutting Machine! Lightweight, ruggedly built unit capable of heavy duty work as well as trenching, joint cutting and patching.

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*DIAMOND TOOL ASSOCIATES

P. O. BOX 85 HAWTHORNE, CALIFORNIA

BOART TOOLS

For more facts, use Request Card at page 18 and circle No. 287

Announce new loader for utility tractors

The Model B-500 hydraulic loader for utility tractors has a 1,700-pound lifting capacity. Its raised height under the bucket is 10 feet, with an 8-foot clearance when the bucket is dumped at a 45-degree angle. Several attachments are available.

Its Model B-500 hydraulic loader for utility tractors is announced by the Johnson Hydraulic Equipment Co.

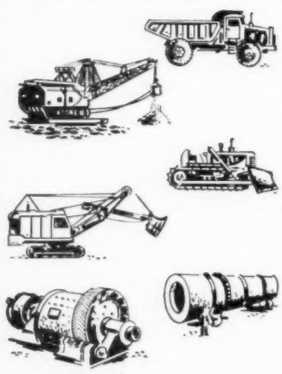
Features of the new loader include a universal frame, unobstructed operator vision, and double-acting cylinders. The valves may be located for left or right-hand operation.

The weight of the loader less attachments is 935 pounds. It has an over-all height of 56 inches. The raised height under the bucket is 10 feet, with an 8-foot clearance when the bucket is dumped at a 45-degree angle.

Breakaway capacity for the B-500 is 4,000 pounds, and it has a 1,700-

WANTED

YOUR TOUGH LUBRICATION JOBS



World-famous Whitmore Lubricants succeed where others fail. They are lubricants, not greases. Whitmore's exclusive never-duplicated formulas stop metal-to-metal contact —put wear on the lubricants instead of on costly gears, bearings, and cables. That's why manufacturers of earth, rock, coal, and ore moving and processing equipment recommend Whitmore Lubricants to give you the service they built into your equipment.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

OPEN GEARS, DIPPER STICKS, AND CAMS
Never-duplicated formulas that provide a hard finish impervious to moisture. Absolutely impossible for dust to cling to lubricated surfaces.

ENCLOSED GEAR CASES
Extremely high load carrying capacities for climatic conditions from the Tropics to the Arctic.

WIRE ROPE AND CABLES
Increases yardage life up to three times. Absolutely stops corrosion by penetrating to the cable core and eliminating internal friction.

Complete Line of Lubricants for Hydraulic Units; Torque Converters; Roller, Ball, and Sleeve Bearings; Speed Reducers.

Write for FREE samples, FREE data, FREE "on your job" engineering assistance.

THE WHITMORE MFG. CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

For more facts, use Request Card at page 18 and circle No. 288

pound lifting capacity.

Attachments include a fork lift; 6-foot boom; 3½-foot tine bucket; 5-foot stockpile bucket; 6-foot light material bucket; and a sweep rake and push-off.

A second oil reservoir in the frame can be connected for additional hydraulic equipment.

For further information write to the Johnson Hydraulic Equipment Co., Dept. C&E, 515 W. 78th St., Minneapolis 23, Minn., or use the Request Card at page 18. Circle No. 89.

Two new screening plants are readily portable

Ready portability is an important feature of the new Pioneer aggregate screening plants.

Two new portable aggregate screening plants are announced by Pioneer Engineering.

Designated Models No. 366 and No. 488, the new plants consist of a single-deck buzzer screen and reciprocating plate feeder permanently mounted on a lattice frame conveyor installed on a hydraulic cradle truck. The Model 366 is equipped with a 3×6-foot screen, while the screen on the Model 488 measures 4×8 feet. Feeder and conveyor are matching.

On both models, the screen is pivot-mounted on the delivery end of the conveyor, allowing it to be easily swung to operating position or to be folded under the conveyor for transport. Hydraulic raising and lowering of the conveyor further simplify set-up and operation, according to the manufacturer.

The ready portability of these plants permits on-the-spot production of large quantities of screened gravel, stone, black dirt, and other aggregates.

For further information write to Pioneer Engineering, Division of Poor & Co., Dept. C&E, 3200 Como Ave., S. E., Minneapolis, Minn., or use the card at page 18. Circle No. 84.

This is the end of Product Parade for this month. To obtain further information on any of the products described in this section (which begins at page 71) circle the number given at the end of the item, on the Request Card at page 18.

Newly designed wrench for stuck drill steels

Its newly designed steel pull wrench said to quickly free stuck drill steels is announced by Atlas Copco Eastern, Inc.

According to the manufacturer, the tool features a double-surface locking principle which makes it possible to simultaneously pull and twist the "frozen" steel loose.

The new wrench is designed for use with ⅞-inch hexagonal steels.

For further information write to Atlas Copco Eastern, Inc., Dept. C&E, 151 Linwood Ave., Paterson, N. J., or use the Request Card at page 18. Circle No. 25.

NEW Wylie ROADMASTER MODEL 1520 ASPHALT PLANT

Making New Profits for Contractors!

★ 15-20 Tons Hourly Capacity ★ Completely Mobile

The "1520" meets the demand for a complete self-contained, mobile plant, ready to operate in minutes right at the jobsite. Available also as a skid-mounted unit, with gasoline, diesel or electric power. The Roadmaster is the machine asphalt users have been waiting for — the asphalt plant that has *everything*.

- Fully automatic batching and asphalt metering cycle
- Rotary dryer with forced draft
- Twin-shaft pugmill with enclosed oil bath gear box
- Enclosed bucket elevator and reciprocating feeder
- 400 gallon asphalt tank
- Cyclone type dust collector

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Wylie Asphalt Equipment

WYLIE MANUFACTURING CO., INC.
P. O. Box 7086, Oklahoma City 12, Okla.

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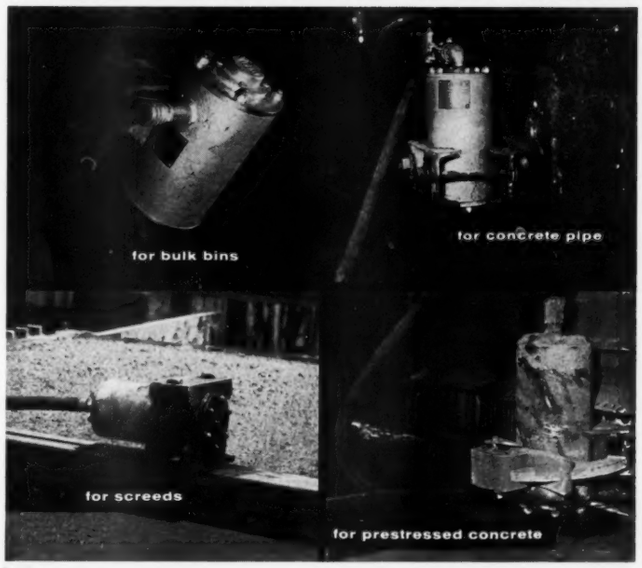
Most Effective Vibration



Viber External Vibrators

Wherever reusable steel forms are set up on a production basis—in concrete pipe production, in the precasting of prestressed girders, beams, roof and wall sections, and in cast-in-place operations such as tunnel lining—VIBER external vibrators offer the dual benefits of reduced cost and improved quality.

In concrete placing, VIBER high speed, low amplitude external vibration increases production, improves quality, promotes economy, reduces absorption and permeability, and strengthens the bond between concrete and concrete, or concrete and steel. This high speed and low amplitude also minimizes the possibilities of damage to expensive forms.

In bulk materials handling, VIBER external vibration speeds the flow of all materials, from the finest powders to large solid pieces—during loading or unloading; while moving through chutes, bins, hoppers or pipes; when measuring, packaging or sorting.

High speed, low amplitude external vibration, pioneered and perfected by the VIBER Company, offers many advantages in concrete placement or bulk materials handling. VIBER vibrators have been proved by hundreds of laboratory and field tests and the practical experience of cement associations, highway departments, contractors, concrete product manufacturers and others.

Seven models of VIBER external vibrators meet an unlimited variety of applications; they are designed for permanent or temporary mounting; speed and amplitude may be regulated; pneumatic or electric power may be used.

***Write today** for illustrated literature and factual information for solving your vibration problems. Viber Company, 726 South Flower St., Burbank 20, California.*

VIBER CO. VIBRATORS

Pioneers and leaders in the manufacture of vibrators.

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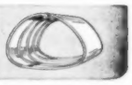
Surveying washington

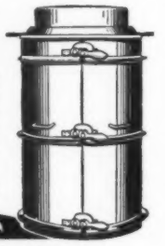
by HUBERT KELLEY, JR.

No Matter What SIZE... No Matter What SHAPE... 

QUINN CONCRETE PIPE FORMS

Set The STANDARD For Producing Quality Pipe!

Over 50 years of experience go into the production of every Quinn Concrete Pipe Form. That's why the Quinn Heavy Duty form is recognized as the STANDARD the world over for producing quality concrete pipe at the lowest cost. Used in making pipe by vibration, spading, or tamping. Sizes for pipe 10" to 120" and larger. Tongue and groove (as shown) or bell end pipe in any length desired. No matter what size, shape, or length pipe you need, there's a Quinn pipe form made to fit your requirements. Write today for our FREE catalog and estimates.



Also Manufacturers of QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS BOONE, IOWA

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More engineering graduates are now being turned out by universities—and this is an encouraging trend in these days of severe engineering manpower shortages.

The Department of Health, Education and Welfare reports that in the 1955–56 school year, our colleges and universities conferred 26,312 bachelor's degrees in engineering. This is 3,723 or 16.5 per cent more than in the previous year.

The number of such degrees conferred in the 1955–56 year actually comprised 8.5 per cent of all first-level degrees issued in all fields of endeavor. Only in elementary education were more bachelor's certificates awarded—35,908.

The total of master's degrees in engineering also showed an upturn, although it was not as sharp. Degrees were conferred on 4,724 students in 1955–56, a gain of 5.4 per cent over the 4,484 who got their master's degree in the preceding school year.

On the doctorate level, however, the increase in engineering degrees awarded was a slim 1.8 per cent. The total rose from 599 in 1954–55 to 610 in 1955–56.

But these figures are not considered grounds for unbridled optimism. While the volume of degrees at all levels, especially the bachelor's, is expanding, it is problematical whether the number of graduates is increasing enough to make an appreciable dent in demands for engineering talent for some time to come. Estimates here are that the catching-up process will take many years.

Labor department experts point out that of the ten million additional workers that will be needed to sustain our economy in 1965, two million will be in the professional occupations, such as engineering. Thus, they foresee the supply of engineers remaining low, despite a larger outpouring of engineering graduates from our universities.

The manpower problem—and not only the engineering manpower problem—for the construction industry could be especially acute in the future, emphasizes Secretary of Labor James P. Mitchell. The industry, he points out, is already the biggest employer of skilled workers in America, using one third of the total skilled force. He expects this dependence on skilled manpower to rise even more as the industry expands to meet the needs of a growing economy and as more technological changes are made in work methods.

The problem, as the Secretary sees it, boils down to whether the industry will have enough skilled craftsmen to meet an anticipated increase of 30 per cent ($60 billion annually) in the nation's new construction needs by 1965.

Making the problem especially tough, in his view, is the fact that the industry must bear the full impact of the long-range highway construction program, the expenditures for which are expected to reach at least $10 billion by 1965. This program will produce an increasingly heavy demand for operating engineers, bricklayers, masons, construction machinery operators, sheet metal workers, plumbers and pipefitters, electricians and other craftsmen.

Labor Department officials doubt that enough of these workers will be available to efficiently handle large-scale increases in heavy construction and highway activity—unless some changes are made. It is claimed that too few apprentices in some vital construction trades are being trained in

...for every industrial application where heavy-duty braking is required!

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Timken-Detroit® Brakes can stop it!

FSH... FLOATING SHOE HYDRAULIC BRAKE

Designed for close control with heavy loads

Unequalled stopping power and outstanding control are characteristic of the FSH. The brake shoes operate with a floating action. This permits the shoes to center themselves in the drum . . . eliminates the danger of liner loads concentrating at one point. The result of this even load distribution is a dependable, controllable brake . . . in either direction of travel.

The FSH now is available in a wide range of sizes for dependable control application on industrial, construction and materials handling equipment.

Other outstanding features offered by the FSH Brake are listed below:

Mechanical Parking Brake Hook-Up. A separate parking brake is no longer necessary with FSH. If specified, the FSH Brake can be furnished with a mechanical parking brake linkage.

Long-Life Lining. Brake lining is bonded to the shoe to give maximum lining area.

Positive Automatic Adjustment for special applications. One application of the foot pedal sets the automatic adjustment. No further adjustment is required during the full life of the brake lining.

Positive Contact Drum Seal. Where a sealed brake is required, the FSH incorporates a seal between the brake backing plate and brake drum.

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BRAKE DIVISION
Ashtabula, Ohio

For every industrial, agricultural or automotive application where braking is required!

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relation to journeymen losses and that the pace—and quality—of this training must be improved.

The department says the solution to the problem lies in providing first-rate vocational instruction in first-rate schools and offering quality apprenticeship and on-the-job training programs. Thus, the challenge is one for both our educational system and the construction industry.

Inflation in highway costs has been arrested appreciably since the early months of this year. The government reports that the index of average bid prices for federal-aid construction increased by less than 0.1 per cent between the second and third quarters. A similar small rise was recorded between the first and second quarters.

The last sizable jump in the index occurred between the final quarter of 1956 and the first three months of this year. It rose by 1.9 points, from 140.7 to 142.6.

While the index increased only slightly between the first and third quarters of this year, the impact of rising costs to date cannot be overlooked. The third-quarter level of 142.8 is 13.8 per cent higher than that in the second quarter of 1955, when the index fell to a low point of 125.5. The base year for the index is 1946 (100).

That the highway price barometer went up at all between the second and third quarters of 1957 is due primarily to a 1.8 per cent increase in the average bid price of structural steel. Costs of structural concrete and surfacing also rose, but they were more than offset by declines in the prices of structural reinforcement, composite structures and excavation.

More heartening road news was disclosed by Secretary of Commerce Sinclair Weeks, who proudly announced that 2,102 miles of new routes had been affixed to the interstate highway system. This completes apportionment of the 41,000-mile network.

The addition of 1,000 miles was expected. Congress had authorized such an expansion of the 40,000-mile system when it enacted the Highway Act of 1956. But the other 1,102 miles came as a surprise. It was made possible, Weeks explained, because that mileage had been saved through more direct routing of highways included in the 40,000-mile authorization.

The 1,102 miles of new routes made possible by location savings include these city-to-city links: Canton, Ohio, to Charlotte, N. C., 431 miles; Pittsburgh to Erie, Pa., 102 miles; Ogden to Echo Junction, Utah, 40 miles; Nashville, Tenn., to Cairo, Ill., 170 miles; San Antonio to Corpus Christi, Texas, 143 miles.

Big business for construction—aside from work on new highways—is maintenance repair work on our roads. Outlays in 1956, the Commerce Department reports, totaled almost $2 billion compared to just over $1.4 billion in 1950.

Of this 1956 total, $752 million went for repair-maintenance by the states, $710 million for work by counties, and $508 million for work by municipalities. The spending for highway upkeep at all three levels of government has been climbing steadily over the past decade.

Some of the rise, of course, stems from higher construction costs. But a good share represents definite stepped-up activity aimed at keeping the expanding road network in operating shape.

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NEW ROTARY SWEEPER
BROOM CORES
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And many others
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SUGGESTION—To faraway users. Order cores only without any fibres but ready to fill.

Also furnished filled with Palmyra-Hickory or Brass Fibres or even Spring Steel Wires.
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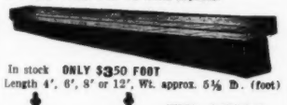
Drag Broom Levelers with Spring Steel Wires or Brass Fibres six inches wide and lengths to 12 feet, and now three inches wide. No frame required.



In stock ONLY $3.50 FOOT
Length 4', 6', 8' or 12', Wt. approx. 5½ lb. (foot)

THE LITTLE PECKERWOOD
3" wide, 15" long, with two bolts, fits your present frame.
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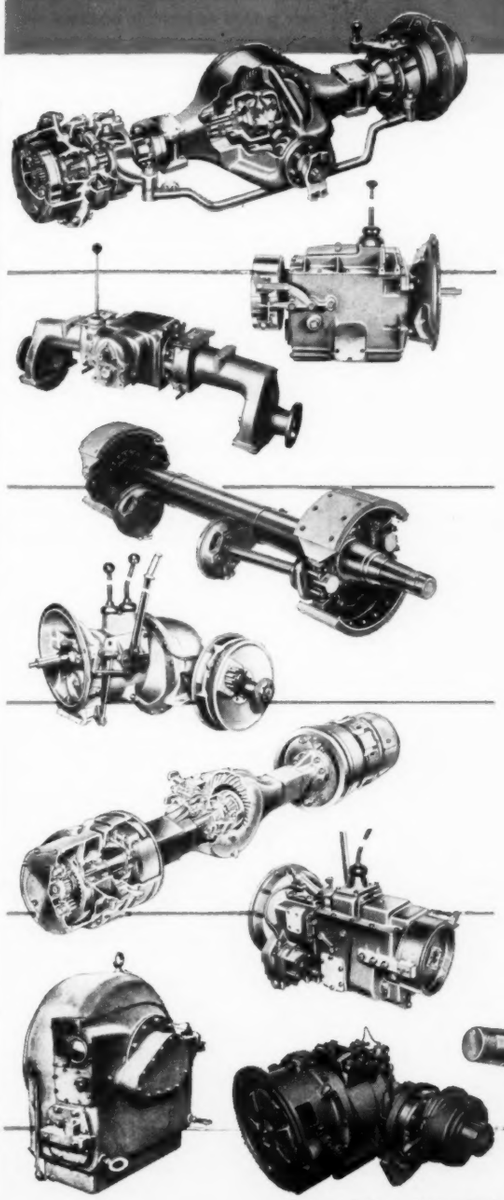
From fly-wheel to drive-wheel
. . . let it be CLARK



There's no finer assurance of a long and profitable life for a revenue vehicle than Clark units delivering horsepower from fly-wheel to tires. That basic usefulness extends with equal effectiveness to stationary power plants.

It's a distinguished family of proved money-makers—every one a product of planned specialization in this vital area of power transmission; every one solidly proved by millions of low-cost miles.

Today, as for more than a half-century, it's good business to do business with CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
BUCHANAN 7, MICHIGAN

For more facts, use Request Card at page 18 and circle No. 294

labor review

The annual rate of new **private housing** starts fell more than seasonally in September, dropping below the $1 million mark again, the Bureau of Labor Statistics reports.

Seasonally adjusted, new private housing units were started in September at an annual rate of 990,000—down 2 per cent from the August rate of 1,010,000, but still 6 per cent above the March low of 933,000. However, the rate of new home-building last month was 2 per cent below the 1,008,000 annual pace during September of last year.

In actual numbers, a total of 90,000 new units—private and public—was started during September, a 5 per cent decline from August and a drop of 4 per cent from the same month a year ago. Private housing starts, at 88,000, were down 5 per cent from August, and were 3 per cent below September, 1956. Public housing put in place during the month fell to 2,000 units—lowest so far this year.

From January through September, a total of 793,400 dwelling units was placed under construction, about 10 per cent below the figure for the comparable period of last year and the lowest since 1949. However, the lag of 1957 housing starts behind 1956 has narrowed steadily from about 16 per cent earlier this year to the current 10 per cent.

* * *

Winding up current contract negotiations by the **Chicago building trades,** two employer associations signed with Local 502 of the Cement Finishers for a 20-cent-an-hour wage increase which will be retroactive to June 1.

Employers affected by negotiations of the Builders Association of Chicago and the Concrete Construction Association did not anticipate much trouble with the retroactivity, an employer spokesman indicated, since most of them had expected the retroactive increase and had been paying it to their employees. Some 2,000 cement finishers are affected.

Local 502 originally had accepted, then rejected the 20-cent offer. However, protracted negotiations and the assistance of a federal mediator brought eventual agreement. The new rate is $3.45 an hour; in addition, employers pay 10 cents an hour for pensions and another 10 cents for the union welfare fund.

* * *

A Washington State contractor, Montag, Halvorson, Austin & Associates, sitting on top of an uneasy jurisdictional truce between the Carpenters and Ironworkers at its Ice Harbor Dam project, is asking the Federal District Court at Yakima, Wash., for **$514,000 in damages** from the Carpenters.

The damage suit stems from "three distinct work stoppages" at the project, which the firm claims were "caused by the carpenters over demands for the assignment of work to them which had been assigned to the ironworkers. The suit is brought under Section 303 of the Taft Act, which gives parties injured by illegal strikes the right to file damage suits in Federal District Courts.

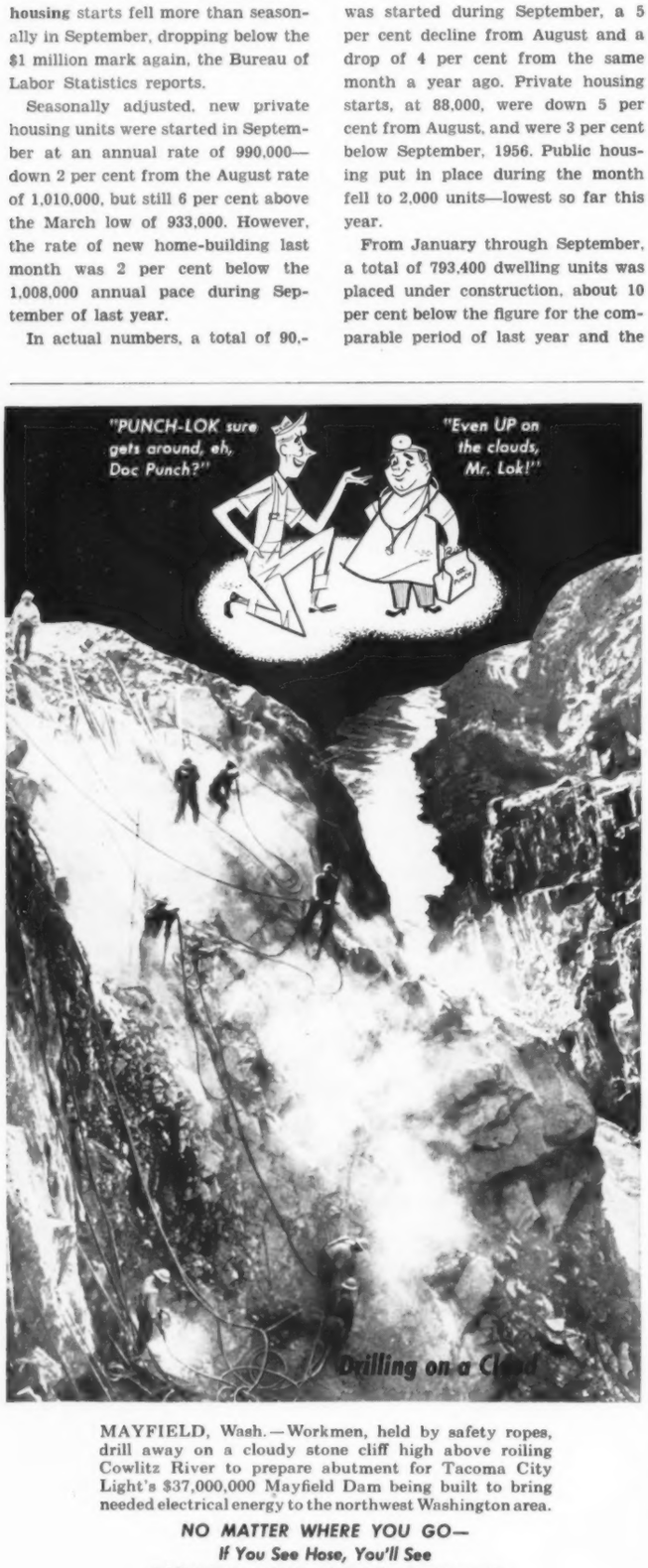
The carpenters struck in a dispute over the wooden and metal forms. The union based its claim on an alleged International "understanding" which splits the work in question between the two crafts.

In asking the court to award the damages, the contractor made the following complaint: "During the work stoppages the contractor was forced to maintain all of his supervisory personnel on the payroll in order to be ready to resume operations as rapidly as possible. This cost, plus plant rental, bonding capacity, insurance, and many other factors in the highly complex organization that a contractor must support on a project of this size all added up to the damages which the contractor now seeks to collect from the Carpenters' Union.

"The Taft-Hartley Act is specific in relation to the boycotting or other unlawful acts in which a union strikes an employer with the purpose of forcing the employer to assign work to its members rather than to employees of another craft. It further states that whoever shall be injured in his business by reason of such action may sue in Federal District Court to recover damages. It is under this Act that the contractor has brought action".

* * *

The Bureau of Apprenticeship and Training estimates that about one of every four **skilled craftsmen** in the United States worked in the construction industry in 1950, and, in general, those going into construction crafts stood a better chance of getting be-



MAYFIELD, Wash.—Workmen, held by safety ropes, drill away on a cloudy stone cliff high above roiling Cowlitz River to prepare abutment for Tacoma City Light's $37,000,000 Mayfield Dam being built to bring needed electrical energy to the northwest Washington area.

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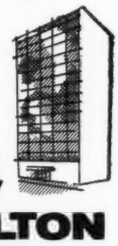
■THE LITTLE SQUARE
Chicago's newest restaurant and lounge



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HAMILTON HOTEL
20 SOUTH DEARBORN
"Preferred by guests in CHICAGO"
CHICAGO
In Kansas City, it's The Bellerive Hotel
100% air-conditioned

For more facts, circle No. 296

yond the journeyman level, or even of becoming self-employed, than those going into other crafts. These estimates were made by Carl Easton in a recent issue of *The Occupational Outlook*.

Easton finds that some construction trades "rather consistently" have failed to train enough apprentices to replace journeymen who retired, died, or became disabled. Special culprits in this regard, he reports, are the carpenters, structural iron workers, painters, paperhangers, and glaziers. If construction activity remains at a high level, Easton points out, more apprentices must be trained. Among painters, paperhangers, and glaziers, changing technology has reduced the number of people needed, so apprentice shortages are not as serious. But among carpenters the need for trainees is crucial, he says, and, "a steady influx of new, fully trained workers to this craft is essential to the future welfare of the construction industry as a whole".

* * *

Some $3 billion would be available for **construction of port facilities** under the terms of a measure proposed by Sen. J. Glenn Beall (R., Md.).

Beall's program would authorize $300 million each year for ten years for new port facilities and repair when private financing for such projects is unavailable. The government would foot up to 90 per cent of the costs of the project; the borrower would pay the rest. The aim of the measure is "to foster the interstate and foreign commerce of the United States, and to provide for the national defense of the United States."

The measure will be introduced when Congress reconvenes in January, Beall says.

* * *

A survey of almost 300 private **pension plans** by the New York State Department of Labor indicates that workers who retire under pension plans established unilaterally by their employers are probably due for higher monthly benefits than those retiring under plans negotiated by unions; but chances are that plans set up through collective bargaining are financed entirely by the employer, while unilateral plans often call for regular contributions by the employees.

The study, which is limited to plans covering 1,500 or more workers, includes 18 pension plans in the construction industry. All but one of these apply to tradesmen in the New York metropolitan area, and all are multi-employer plans established through collective bargaining.

According to the survey, the biggest construction industry pension program in the state was negotiated by the New York City District Council of Carpenters. Some 24,000 union members can look forward to a monthly income of at least $114.40 when they complete 25 years' service and reach the age of 65.

The most liberal benefits appear to be called for in a plan negotiated by IBEW Local 3 and New York City electrical contractors. The Local plan, plus benefits due under a state-wide plan, promises about 10,000 electricians a monthly income of $200 if they retire after age 60 and have been a union member for at least 15 years. The Local 3 plan also provides a pension of $70 a month for any union member of 10 years' standing who is disabled. There is no age requirement for the disability income. Under the state-wide IBEW pension plan, union members must pay $1.60 a month. The Local 3 plan requires no employee payment unless the fund falls below $5 million, at which time members must contribute one per cent of their wages.

Benefits due under construction industry plans seem to compare favorably with those provided workers in other industries. The average monthly retirement income under all 290 plans studied is $133 a month after 20 years of credited service. After 30 years, the median is $148. This includes $88.50 in Social Security benefits for those of age 65 who earned $3,000 a year on the average. Workers who earned $6,000 get an average $162 a month after 20 years; those with 30 years' service retire with an average monthly income of $208.

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REAR-DUMPS

for construction, mine, quarry and industrial work

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12 tons payload . . .
11 cu. yds. heaped . . .
143 h.p. . . .
18.00x25 tires . . . top speed loaded of 26.5 mph . . .
Torqmatic Drive .

With overhung engine type tractors and full 90° hydraulic steering, these two new Euclid Rear-Dumps have excellent maneuverability for close quarter work and accurate spotting at loading and dumping areas. Big tires provide extra traction and flotation for soft fills and difficult hauls. The low over-all loading heights and rugged construction permit easy loading with all types of equipment. Smooth bodies with 3-stage, double-acting Euclid hoists assure quick shedding of loads.

Downtime and maintenance costs are held to a minimum as a result of the easy service accessibility of all major components. Interchangeability of the semi-trailer rear dump bodies with 7 and 18 yard scraper bowls provides extra flexibility for changing job requirements.

Your Euclid Dealer has detailed information on these versatile "Eucs" as well as other Rear and Bottom-Dump models, Scrapers and Crawler Tractors . . . have him show you why ***Euclids are your best investment.***

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AND THE S-18 REAR-DUMP

35 tons payload . . .
32 cu. yds heaped . . .
300 h.p. . . . 27.00 x 33 tires
Torqmatic Drive . . .
NoSpin differential.

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

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Two girls in the accounting department of J. F. Pritchard & Co. tabulate field labor information on IBM machines. The information, punched into cards for each code of work, contains data on the hours a man works on a job, and is sent in daily by each foreman on a preprinted form.

Machines cut 50 per cent f fi

Mechanization of field payroll and labor distribution paper work has been a great advantage to J. F. Pritchard & Co., Kansas City, Mo. At one time, the job of compiling payroll information and labor distribution figures for the firm's operations was handled manually, and in large part by field personnel.

The Pritchard company handles engineering, design, and construction services for the chemical, gas, petroleum, and power industries, plus an airport division and an affiliate that specializes in waste-disposal plants and water works. As can be seen by the company's operations, there was a lot of paper work involved for payrolls and field distribution reports.

In the past, each foreman took a blank labor distribution form, filled it out with the names of his men, and the kind of job each was doing. During the day the foreman listed the number of hours worked at each job. If a man was reassigned to several different jobs during the day, the foreman had to record each job and the hours worked on it.

At the end of the day, the field clerk entered the rates beside the hours, figured gross pay, and totaled this at the bottom of the sheet. This information was collected and recapped by type of work for the labor distribution figures. Total daily hours were entered on payroll sheets for employees and the payroll was figured, gross payroll was joined to labor distribution, and original copies were mailed to the home office.

These figures were subject to many errors, were illegible, and sometimes arrived late at the main office.

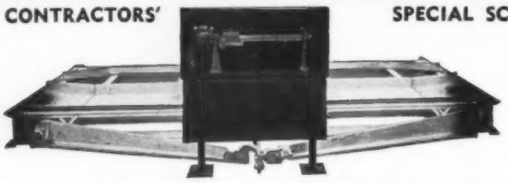
New paper-work system

A few years ago, J. F. Pritchard & Co. installed IBM equipment in the home office to mechanize the compiling of construction costs. The firm realized the equipment could also be used to advantage for payrolls and labor distribution.

This mechanization has permitted the firm to reduce the field clerical costs by fully 50 per cent, even without taking into account the gains in production achieved by having the

WINSLOW—PORTABLE TRUCK SCALE

THE CONTRACTORS' SPECIAL SCALE



For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site. Cap.: 15-18-20-30, 50 tons.

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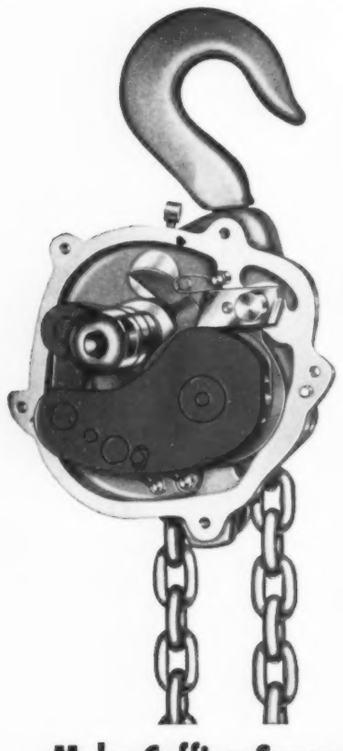

New ..... Compound ..... Levers .....

Make Coffing Super Powers the most efficient hoists in their class

Super Power hoists are designed around a new compound leverage principle. The levers, which replace the gears of conventional designs, enable workmen to raise loads with less handle pull than other hoists of the same capacities. Since use of the levers also reduces hoist size and weight, the workmen have 20% less weight to carry to the job.

Available in 1½ and 3 ton capacities in aluminum, and 1½ to 5 tons in malleable iron, Super Powers require little maintenance, since moving parts have sealed-in lubrication. Overload testing, "Safety Valve" handles, and constant load-locking ratchet and pawl assure safe operation. For complete details on these hoists, consult your Coffing distributor, or write to us for Bulletin L-3.

DUFF-NORTON **Coffing Hoist**

DIVISION OF **DUFF-NORTON COMPANY**

810 WALTER STREET DANVILLE, ILLINOIS

Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks, Ratchet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

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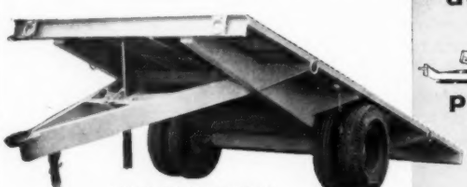
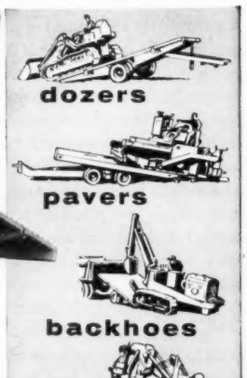
What do you haul?



MILLER "B" 10 ton $1250.* F.O.B. Milwaukee
Any optional equipment extra
*Plus Freight and 10% Federal Tax



MILLER *Tilt-Tops* take 'em all!

Whatever you haul . . . from 3 to 13 tons . . . there's a MILLER Tilt-Top to fit your equipment . . . load it, haul it, faster! easier! A variety of models equipped with single or tandem axles . . . over, or between-the-wheels platforms . . . put mobility under all sorts of equipment . . . save the extra loading time and extra cost of larger more cumbersome trailers. MILLER'S big oak decked platforms merge with the ground for the easiest kind of drive-on loading . . . save the bother of skids, cribbing or jacks. With a MILLER, ONE man can tilt, load, be on his way to the next job in less than TWO minutes . . . slash time between jobs. See this fast loading line of MILLER Tilt-Tops at your MILLER distributor today!

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See your MILLER distributor or write for FREE literature to:

Miller® Tilt-Top® Trailer Inc.

456 S. 92nd St., Milwaukee 14, Wisc.

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Field clerks, accounting machines, and cards simplify field payroll and labor distribution paper work for engineering firm

cen f field clerical costs

foremen free to supervise their men. In addition, the company has been able to develop detailed, timely, and accurate information on job costs.

Weekly field cost

For example, the company prepares weekly field cost status reports on all jobs. These include labor hours, labor dollars, material quantities, and construction machinery costs to date on a job. The reports also include original estimates for that job, and the per cent completion of each part of the job.

From these reports, the cost control unit can analyze actual and estimated performance, and determine where it is more practicable to use machines than men, and vice versa. By running the man-hour unit relationships on a series of jobs the J. F. Pritchard firm's control unit has been able to develop accurate work patterns which are used in bid estimates.

How system works

When a man goes to work for the company, he fills out a basic information form from which Pritchard & Co. punches a master card for him. Using this card, which contains the man's hourly wage rate, barge number, code for his craft, and the foreman's code, the company preprints on the IBM 402 accounting machine the foreman's daily labor distribution reports. Each report lists the name and basic information about the foreman and all the men who work for him. A week's supply is sent to the field, along with a weekly time summary sheet, similarly produced.

During the day, the foreman lists on the daily report the number of hours each man worked at specific tasks. The field clerk fills in accounting codes and totals the sheet. He keeps a copy and sends the report in daily. A card is punched from them for each code of work.

At the end of the week, the field clerk fills out the weekly time summary sheet, using his totals from the daily reports. He sends it into the payroll department where a payroll batch sheet is prepared for internal control. The sheet lists any payoffs in the field, travel fare, and similar expenses.

The summary is audited and passed on to the IBM department where a card is punched for each worker, showing total hours worked, and rates of pay. These cards are then merged with the payroll master cards and the cards punched for deductions, travel fare, and the like, and then run through the 602A calculator which extends hours and wages to gross pay, computes payroll taxes, subtracts deductions, figures the net amount of each check, and punches in this information. The cards are then run through the accounting machine which prints the checks and check register.

Before the checks are sent out, a mechanical zero balance is taken on the register and audited. The balance sheet shows field labor by classification by employee. It supports the payroll, as described, and the field labor distribution report.

The field labor distribution report is printed weekly and groups field labor costs by jobs rather than by employees. It is broken down by job, and by specific tasks on each job—regular hours worked to date, premium hours to date, labor this week, and total amount of labor to date. Each of these items is totaled for the entire job, and listed at the bottom of the report form. The form tells Pritchard & Co. how much labor has gone into a job since it started and how much of that labor was expended on which tasks.

This report is produced by merging

Foundation exploration costs less with Hoffman Bits because they eliminate guessing about formation structures for quick, accurate job estimates. Exposing only the sharp, hard diamond edges to the work. Hoffman Bits cut rather than scrape. They produce clean, smooth cores at lower footage costs — use less power — last longer. Designed and tested for each application. Hoffman Bits are the answer where core drilling accuracy and economy are important.

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HOFFMAN BROTHERS DRILLING COMPANY

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SINCE 1902

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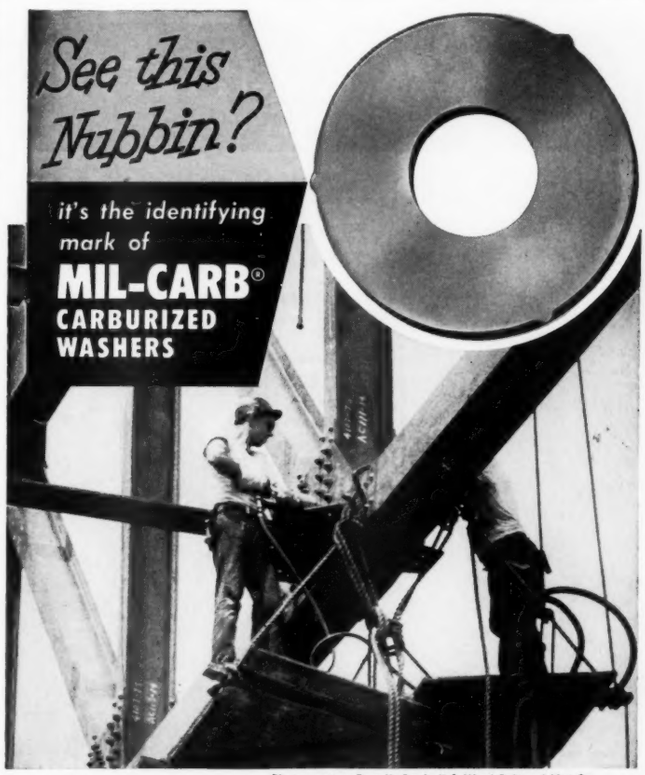

Photo courtesy Russell, Burdsall & Ward Bolt and Nut Co.

From an appearance standpoint, all washers, regardless of brands, practically look alike. But, *there's a big difference in quality!* That's why, for easy identification and to insure your getting the very best, Mil-Carb Carburized Washers are identified by 3 "nubbins" on the outside rim.

Mil-Carb washers are outstanding on at least three counts:

1. **Only Prime Quality Special Soundness Steel is used for strength equalling or exceeding the rigid specifications of ASTM designation A-325 *at all times!***
2. **A special treating process provides an exceptionally hard "outer skin" to resist grinding by the nut under the impact wrench *when others fail!***
3. **MIL-CARB washers are always uniformly flat and smooth with dimensions conforming to the American Standards Association.**

For your own protection and as a guarantee of the unyielding permanence of your steel structure . . . "look for the nubbin". . . specify MIL-CARB Carburized Washers. Available in six sizes, from ⅝" to 1⅜", packed in 200 lb. kegs.

Distributed by Leading Bolt and Nut Manufacturers and

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WROUGHT WASHER MANUFACTURING CO.
The World's Largest Producer of Washers
2118 S. BAY ST., MILWAUKEE 7, WIS.

For more facts, use Request Card at page 18 and circle No. 302

the cards punched from the daily foreman's sheet with summary cards produced when the last labor distribution report was printed the week before. These are run through the accounting machine, which prints the new report and punches a new set of summary cards, including the past week's information.

Field labor statistics also go into the job field cost status reports as a source of information for control and bidding on contracts.

These reports are produced by merging the labor summary cards with construction and material cards, and running them through the accounting machine. The company is able to issue the reports within less than a week after the payroll period ends.

Benefits of reports

In addition to direct benefits, like lower clerical costs, there are other by-product benefits from Pritchard & Co.'s present system. It is now easier for the company to compile from the punched cards in the files the earnings records for quarterly and annual reports to the federal and state governments.

This system also enables the company to have better control of clerical costs; and it makes statistics available when needed, in detail, and in the most accurate and usable form.

THE END

More than 1,100 motorists have mailed in toll payments since the N. J. Garden State Parkway started using honor-system envelopes.

G. V. Leece (left), president of Gardner-Denver Co., and H. N. Mallon, chairman of Dresser Industries, Inc., discuss a proposed merger of the two companies.

Gardner-Denver, Dresser make plans for merger

The Gardner-Denver Co., Quincy, Ill., will be acquired by Dresser Industries, Inc., of Dallas, Texas, if shareholders of both companies approve. Voting is scheduled for next month by shareholders of both firms.

Under the acquisition plan, shareholders of Gardner-Denver will receive one share of Dresser common stock in exchange for each share of Gardner-Denver common in a tax-free reorganization.

The Gardner-Denver firm, which produces compressors, pumps, rock drills, and air tools, will be combined with four present Dresser subsidiaries to form a wholly-owned subsidiary of Dresser Industries, known as Gardner-Dresser Co. This subsidiary will combine complementary but non-competitive lines into a full line of machinery and equipment. It will have headquarters at Quincy, Ill., and G. V. Leece, president of Gardner-Denver, will serve as its chief executive officer.

In addition to Gardner-Denver, companies that will form Gardner-Dresser include Clark Brothers Co., Olean, N. Y.; Pacific Pumps, Inc., Los Angeles, Calif.; Roots-Connersville Blower Co., Connersville, Ind.; and Ideco, Dallas, Texas.

Corps names Col. Milwit to North Central Division

Col. Herbert Milwit has been assigned Assistant Division Engineer, U. S. Army Engineer Division, North Central, Chicago, Ill. He replaces Col. Roland C. Brown on the staff of Brig. Gen. Louis J. Rumaggi, Division Engineer; Col. Brown is now Deputy.

Col. Milwit recently completed a 3-year tour of duty in Japan, and has been decorated for his meritorious service as Deputy Engineer and Chief of the Intelligence Division, Office of the Engineer, Headquarters U. S. Army Forces, Far East, and Eighth U. S. Army, Japan.

M. V. Bridge Co. elects

Theodore B. Russell has been elected vice president of the Mount Vernon Bridge Co. of Mount Vernon, Ohio.

Since 1925 Russell had been with the Pittsburgh-Des Moines Steel Co. as manager of bridge sales until joining Mount Vernon.

MARVEL Synclinal FILTERS

For Efficient Filtration of—
Hydraulic Oils—
Fire Resistant Hydraulic Fluids—
Coolants — Lubricants —
Water

SUMP TYPE (cutaway)

OVER 800 Original Equipment Manufacturers Install Marvel Synclinal Filters as Standard Equipment

Meet J.I.C. Standards

LINE TYPE (cutaway)

PROTECT EQUIPMENT REDUCE MAINTENANCE

Marvel Synclinal Filters installed in the sump or on the line preceding pump offer maximum protection on all hydraulically actuated and other equipment utilizing low pressure circulating oil systems. Maintenance and production costs are reduced because Marvel Synclinal Filters BALANCED design offers greater ACTIVE filtering area with sufficient storage capacity for filtered out damaging particles, thus, longer periods of productive operation are attained at minimum "down time" due to maintenance and repairs.

CONSTRUCTION ENGINEERS and MAINTENANCE MEN whose job it is to keep production machinery operating at peak efficiency and who have recognized the superiority of Marvel Synclinal Filters in the filtration of hydraulic oils, fire resistant hydraulic fluids, coolants, lubricants, etc. are specifying Marvel Synclinal Filters on all new equipment and standardizing with Marvel Synclinal Filters on all existing equipment.
Another outstanding reason for their preference is the simple construction of Marvel Synclinal Filters which allows them to be easily disassembled, thoroughly cleaned and reassembled on the spot, by any workman in a matter of minutes. Line type operates in any position and may be serviced without disturbing pipe connections.

A SIZE FOR EVERY NEED

Available for sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be attained by multiple installation (as described in catalog). Choice of Monel mesh sizes range from coarse 30 to fine 200.

IMMEDIATE DELIVERY

Catalogs contain complete engineering data and dimensional charts making it easy to order a filter for your specific requirements and get Immediate Delivery.

Catalogs containing complete data available on request

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Phone: JUniper 8-6023

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- ☐ Catalog #108—For Hydraulic Oils, Coolants, Lubricant.
- ☐ Catalog #200—For Fire-resistant Hydraulic Fluids (Aqueous Base)
- ☐ Catalog #400—For Fire-resistant Hydraulic Fluids (Synthetic)
- ☐ Catalog #301—For Water.

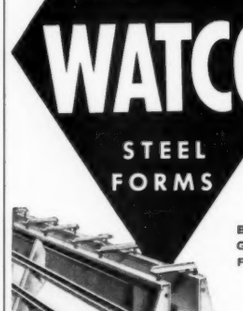
CE-12

Name .....
Company .....
Address .....
City .....
State .....

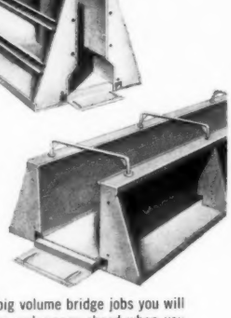
For more facts, use coupon

STAY AHEAD OF SCHEDULE WITH

WATCO STEEL FORMS



BRIDGE GIRDER FORM



SQUARE PILING FORM

On big volume bridge jobs you will be time and money ahead when you cast piling and girders in WATCO steel forms.

These forms are designed for mass production of all State Road Department and AASHO-PCI bridge girders. Available in 10 ft. sections which provide ease in handling in lengths up to 50 ft. — at any one time. Removable side forms enable you to turn over beds quicker and set up additional lines.

WATCO forms are a product of the pioneer organization in fabrication of steel forms for precast prestressed concrete. They offer vital advantages found in no other competitive equipment. One of our representatives will be glad to supply complete details. Write today for his assistance.

PLANT CITY
Welding & Tank Co.
P. O. BOX 1308, PLANT CITY, FLORIDA

Member of Prestressed Concrete Institute

For more facts, circle No. 303

Product LITERATURE

For further information on any of the literature described in the following section, circle the designated number on the Request Card at page 18.

Ice-removal salt—a booklet about Sterling Storite, a new anticaking agent for the storage of ice-removal rock salt. Tells how the chemical works and offers suggestions for its best application. Illustrated with photographs.

Write to the International Salt Co., Dept. C&E, Spruce and Adams Sts., Scranton, Pa., or use the Request Card at page 18. Circle No. 116.

Mobile radio equipment—a new brochure on General Electric's two-way mobile radio equipment. Shows the wide range of equipment designed to fit individual needs based on present FCC rulings, and discusses GE's current engineering of equipment with future FCC policies in mind. Also includes sections on power, frequency, band-width, voltage, remote and repeater operations. Bulletin ECR-497.

Write to the General Electric Co., Communication Equipment, Dept. C&E, Electronics Park, Syracuse, N. Y., or use the Request Card at page 18. Circle No. 69.

Hard-facing alloys—a booklet describing the chemical composition, as well as some properties, typical applications, and application procedures for 11 Haynes alloys that are available as bare rods, crushed particles and powder. These include four iron-base alloys, three cobalt-base alloys, Haystellite cast tungsten carbide, and three nickel-base alloys.

Write to the Haynes Stellite Co., Division of Union Carbide Corp., Dept. C&E, 30-20 Thompson Ave., Long Island City 1, N. Y., or use the Request Card at page 18. Circle No. 65.

Power tools, attachments—a catalog describing the Mall Tool Co.'s extensive line of power tools and attachments. Includes several types and sizes of concrete vibrating and rubbing units. Photographs, drawings, specifications.

Write to the Mall Tool Co., Division of Remington Arms Co., Inc., Dept. C&E, 939 Barnum Ave., Bridgeport 2, Conn., or use the Request Card at page 18. Circle No. 62.

Equipment for concreting—a complete and well illustrated catalog describing the Cmetco line of concrete placing and finishing equipment. Details construction features and operating characteristics of Cmetco power buggies, vibratory screeds, and many others. Price list included.

Write to the Creative Metals Corp., Dept. C&E, 1290 Powell St., Emeryville, Calif., or use the Request Card at page 18. Circle No. 57.

Core drills—a folder describing Acker Models LD and LLD core drills for foundation test drilling. Detailed information on the design and construction of the units. Photographs, specifications.

Write to the Acker Drill Co., Inc., Dept. C&E, 721 W. Lackawanna Ave., Scranton, Pa., or use the Request Card at page 18. Circle No. 96.

Tire recapping—literature describing Trutred band equipment for recapping off-the-road tires. Also contains data on the Trutred Spreader said to handle sizes through 30.00×33. Illustrated with photographs.

Write to Trutred Tire Molds, Inc., Dept. C&E, 1623 Nadeau St., Los Angeles 1, Calif., or use the Request Card at page 18. Circle No. 94.

For more facts, circle No. 304→

Hydraulic backhoe—a booklet featuring the design and performance characteristics of the Hyster Model D4 hydraulic backhoe for use with Caterpillar tractors. On-the-job photographs; close-ups of major components; drawings; specifications. Also contains a performance analysis chart comparing the D4 with five other leading makes.

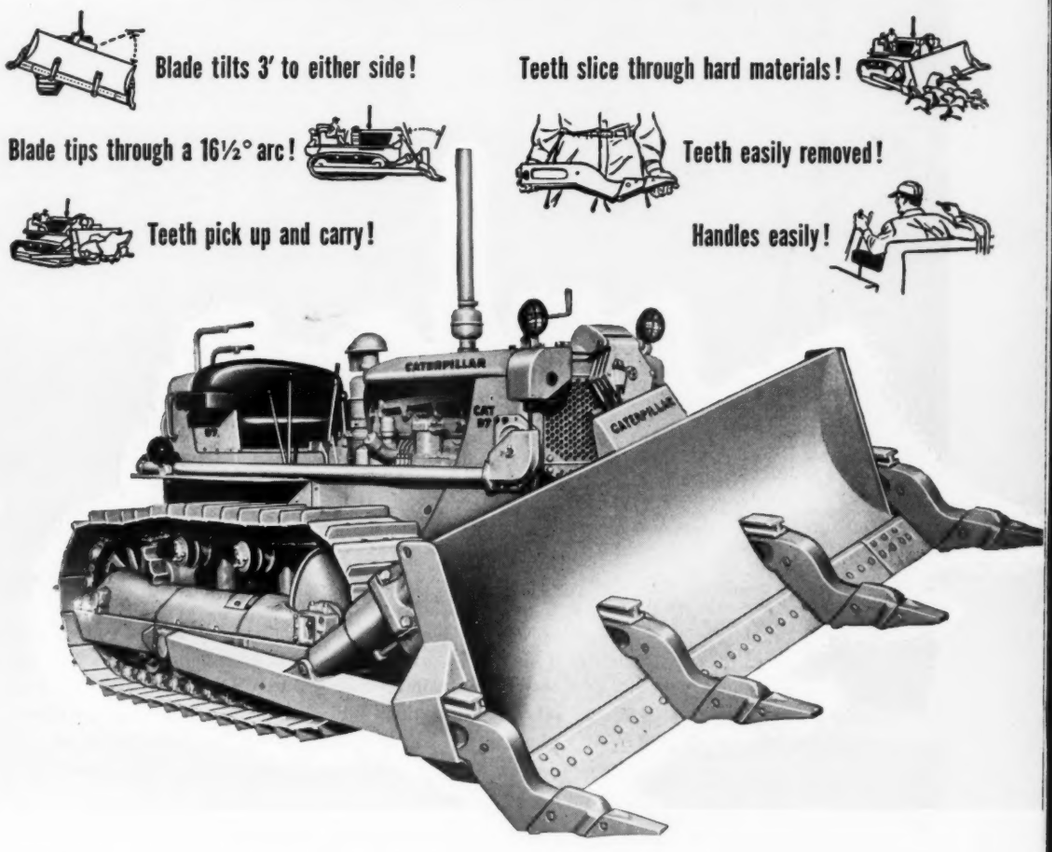
Write to the Hyster Co., Dept. C&E, 2902 N. E. Clackamas St., Portland 8, Oreg., or use the Request Card at page 18. Circle No. 71.

Road materials mixer—a bulletin on the Bros heavy-duty Roto-Mixer said to stabilize, pulverize, blend and mix road materials to a depth of 12 inches. Stresses such features as high horsepower rating and independent hydraulic control of the hood and mixer rotor. Illustrated with photographs. Specifications.

Write to Road Machinery Division, Bros, Inc., Dept. C&E, 1057 Tenth Ave. S. E., Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 41.

Aggregate spreader—a folder describing the Model R Hi-Way spreader said to handle all types of aggregate

NEW! THE CAT* NO. 7G BULLDOZER


Blade tilts 3' to either side!
Blade tips through a 16½° arc!
Teeth pick up and carry!
Teeth slice through hard materials!
Teeth easily removed!
Handles easily!
CATERPILLAR

'DOZER AND RIPPER IN ONE

The brand-new Caterpillar No. 7G Bulldozer is a completely different type of bulldozer. The amazing tilt-tip action, and its four heat-treated cast steel teeth, are an entirely new concept in 'dozing. The Gyrodozer is both a 'dozer and a ripper.

YOU'LL GET HIGHER PRODUCTION

The Gyrodozer rips through hard or frozen materials. Its 23" teeth not only pry out boulders but pick 'em up and carry 'em away. In rocky soil, the wedging action of the teeth surfaces small rocks for scooping up by the 10' 10" blade. On the really tough jobs, the tractor's full horsepower can be put behind a single tooth. The Gyrodozer is ideal for uprooting trees and clearing an area in a hurry.

EASY TO OPERATE

A Cat No. 25 Cable Control raises and lowers the 'dozer and a front-mounted No. 44 double-valve Hydraulic Control tips and tilts the blade. The operator never needs to leave his seat to make a blade adjustment.

GET FULL DETAILS

on the revolutionary new Gyrodozer from your Caterpillar Dealer.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED—
THE HARD WORK

from fine to crushed stone. Illustrated with full-view photos, as well as close-ups of major components. Specifications included.

Write to the Highway Equipment Co., Inc., Dept. C&E, 616 D Ave. N. W., Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 4.

Rotary compressors—a bulletin describing Davey Hydrovane compressors. Stressing accessibility for inspection and repair, illustrations include cutaway photos of component parts. General specifications.

Write to the Davey Compressor Co., Dept. C&E, Franklin Ave., Kent, Ohio, or use the Request Card at page 18. Circle No. 3.

Engine pre-heater—a booklet describing the Kim Hotstart electric pre-heater for diesel and gas engines. Photos show the device installed in tractors, trucks, and other power units. General specifications.

Write to the Kim Hotstart Mfg. Co., Dept. C&E, W. 917 Broadway, Spokane 1, Wash., or use the Request Card at page 18. Circle No. 91.

Portable concrete tester — a folder describing the Soiltest Model CT-711 concrete tester. Also contains data on the Model CT-84 flexure attachment, as well as on several other concrete tester accessories. Illustrated with photographs.

Write to Soiltest, Inc., Dept. C&E, 4711 W. North Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 98.

Complete construction machinery line—an accordion-type, illustrated folder encompassing every unit and attachment manufactured by the I-H Construction Equipment Division. Contains data and brief specifications on each rig. Also offers information on the latest additions to the carbureted power unit line, the newly-introduced V-8 units, the UV-549, and UV-401, and the UV-461. Folder CR-694-G.

Write to the International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 66.

Structural steel—a catalog containing complete technical information relative to Stran-Steel's line of joists, studs, channels, ribbed decking, and metal curtain walls. Includes data on the firm's new 10 and 12-inch joists with 3-inch flanges. Copiously illustrated with drawings and photos, and contains several pages of loading tables.

Write to the Stran-Steel Corp., Dept. C&E, Tecumseh Road at Fink, Ecorse, Detroit 29, Mich., or use the Request Card at page 18. Circle No. 50.

Prestressed cylinder piles—a 20-page catalog describing and illustrating the manufacture, versatility, and economic applications of prestressed-concrete cylinder piles and related prestressed products. Includes information on the merits of prestressed-concrete cylinder piles for foundations of bridges, waterfront, and offshore structures. Numerous photographs of installations, as well as drawings of suggested designs.

Write to the Raymond Concrete Pile Co., Dept. C&E, 140 Cedar St., New York 6, N. Y., or use the Request Card at page 18. Circle No. 72.

Underwater strata detection—literature describing the Edo Model 400 Stratagraph, an electronic device for recording and graphing the strata formations underlying the beds of rivers, lakes, and other relatively shallow bodies of water. Text includes technical details on the unit, and photos depict actual graphs of soundings taken in the New York area.

Write to the Edo Corp., Dept. C&E, 13-10 111th St., College Point, Long Island, N. Y., or use the Request Card at page 18. Circle No. 53.

Expansion joints—a manual entitled "Design Practices And Uses Of Premoulded Joints In Concrete Pavements". Includes comprehensive technical data and illustrations on the many types of premolded joints and their applications, plus installation information.

Write to the Expansion Joint Institute, Dept. C&E, 121 Hill Ave., Aurora, Ill., or use the Request Card at page 18. Circle No. 56.

Contractor's transit — an illustrated bulletin featuring the David White Model 8200 transit designed for builders and contractors. According to the literature, the transit features a full 25-power 360-degree plunging telescope, and gives accurate readings up to one minute.

Write to the David White Instrument Co., Dept. C&E, 2051 N. 19th St., Milwaukee 5, Wis., or use the Request Card at page 18. Circle No. 55.

Backhoes—a folder describing the Ottawa Big Muscle backhoe for use with Allis-Chalmers Models HD-5, 5B, 5G, and HD-6, 6B, and 6G crawler tractors. Includes data on available accessories. On-the-job photographs; specifications.

Write to the Ottawa Steel Division, L. A. Young Spring & Wire Co., Dept. C&E, 435 S. Main, Ottawa, Kans., or use the Request Card at page 18. Circle No. 51.

Diesel power units—a catalog covering the I-H line of six diesel power units. Diagrams, cross sections, exploded views, and photo close-ups illustrate advantageous features. Data on the units' adaptability to any power requirement. Specifications. Catalog CR-509-G.

Write to the Construction Equipment Division, International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 5.

Fluid power equipment—a well-illustrated booklet describing Hydreco fluid power equipment for every mobile application. Text includes data on fluid power pumps, motors, and control valves, as well as telescopic cylinders for lift trucks and dumpers. Photographs, drawings, general specifications.

Write to the Kalamazoo Division, The New York Air Brake Co., Dept. C&E, 9000 E. Michigan, Kalamazoo, Mich., or use the Request Card at page 18. Circle No. 75.

Pumps—a catalog of specification sheets covering a wide variety of Deming pumps. Illustrated with photographs, dimensional drawings, performance charts and tables.

Write to The Deming Co., Dept. C&E, 42 Broadway, Salem, Ohio, or use the Request Card at page 18. Circle No. 83.

Paving the RIGHT WAY-
FREE:
Oil Filter Survey that lists correct WIX replacement Cartridges for every piece of your equipment, plus Inventory Control.
Fleet Manual for a continuing record on every engine —maintenance, repair, performance —at a glance!
There's a specific WIX Cartridge engineered for every engine in construction service ... gas or Diesel — mobile or stationary — for fuel or lube oils.
CATERPILLAR
INTERNATIONAL
ALLIS CHALMERS
DETROIT DIESEL
LE TOURNEAU
EUCLID
MURPHY
and ALL OTHER Construction Equipment!
To bring Maintenance Costs DOWN!
USE WIX HEVI-DUTY OIL FILTERS
. . . and see the results FAST in less down-time from engine troubles! Abrasive grit and dirt in your motor oil can knock out an engine in no-time — but, WIX Filter Cartridges keep oil *clean* all the time! — don't give these contaminants a chance to get in their dirty work. Install WIX Cartridges in all *your* engines. Keep your equipment on-the-job, on-time, and building your profits!
Depend on economical WIX Engineered Filtration Service for timely cartridge replacements. WIX will make a FREE Filter Survey for you listing all your equipment and showing the correct lube and fuel oil filter Cartridge replacements. Also, deliver a reserve supply of these Cartridges to your local WIX Wholesaler. One near-by source of supply for prompt, COMPLETE Oil Filter Cartridge Service — no heavy inventory for you! Ask your Jobber, or write direct, TODAY!
wix®
OIL FILTERS AIR FILTERS
AUTOMOTIVE • INDUSTRIAL • RAILROAD
WIX CORPORATION • GASTONIA • N. C.
In Canada: Wix Accessories Corp. Ltd., Toronto
For more facts, use Request Card at page 18 and circle No. 305

Concrete compression tester—an illustrated fact sheet on the Forney Model QC-225 200-ton-capacity quality control tester. According to the literature, the unit can be standardly equipped for testing blocks up to and including 12×8×18 inches and/or 6×12-inch cylinders, with riser blocks available for half height specimens. Specifications included.

Write to Forney's Inc., Tester Division, Dept. C&E, P. O. Box 310, New Castle, Pa., or use the Request Card at page 18. Circle No. 99.

Soil-sampling equipment—a bulletin illustrating and describing in detail the soil samplers and accessories from Sprague & Henwood, Inc. As well as introducing several new soil testing devices such as the S&H vane shear tester, the literature illustrates engineering improvements to many of the earlier types. Bulletin No. 300.

Write to Sprague & Henwood, Inc., Dept. C&E, 221 W. Olive, Scranton 2, Pa., or use the Request Card at page 18. Circle No. 49.

Weldors' guide—"How to Get Better Welds", a new and completely revised edition of Weldors' Vest Pocket Guide containing 60 pages of useful arc-welding information and data on many units of Hobart welding equipment. A handy, well-designed manual illustrated with photographs, drawings, and several helpful selective charts.

Write to the Hobart Bros. Co., Dept. C&E, Hobart Square, Troy, Ohio, or use the Request Card at page 18. Circle No. 68.

Road graders—a bulletin describing Husky Models 22 and 33 all-purpose road graders and maintainers. Also contains data on the trailer drag shouldering attachment for use with the two machines, and on the Model 11 terracer-grader-ditcher. Photographs of all units.

Write to the Energy Farm Equipment Co., Dept. C&E, 100 Main St., Monticello, Iowa, or use the Request Card at page 18. Circle No. 93.

Prime mover attachments—an illustrated brochure listing many of the prime mover tools offered by Caterpillar for its equipment. Shows attachments for crawlers, wheel units, Traxcavators, and motor graders. A special list is included to help select the proper tool for the particular job application.

Write to the Caterpillar Tractor Co., Dept. C&E, Peoria, Ill., or use the Request Card at page 18. Circle No. 63.

Hard-facing—literature describing Bergstrom Dimaloy abrasion strips, as well as Mangaloy replaceable hammer mill tips, cast-to-shape applicator bars, and tooth re-pointing bars. Illustrated with drawings. Specifications included.

Write to Industrial Overlay Metals, Inc., Dept. C&E, Eaton, Ohio, or use the Request Card at page 18. Circle No. 82.

Engines—a catalog of Kohler engines. Contains complete descriptions and specifications of all models and variations in the Kohler line, including the 3.6-hp K90, the 6.6-hp K160, the 12.5-hp K330, and the 24-hp K660. Illustrations depict the engines in a variety of applications.

Write to the Kohler Co., Dept. C&E, Kohler, Wis., or use the Request Card at page 18. Circle No. 67.

Hydraulic hook scale—literature describing Martin-Decker's Sensater SU-20 hydraulic hook scale. Illustrations depict many of the applications of the 5-ton-rated-capacity scale, which is said to be accurate enough to be certified in any state.

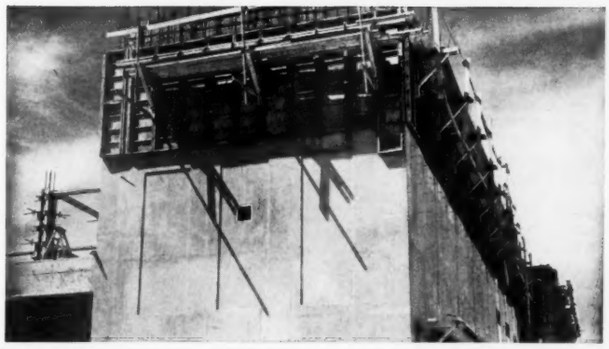
Write to the Martin-Decker Corp., Dept. C&E, 3431 Cherry Ave., Long Beach 7, Calif., or use the Request Card at page 18. Circle No. 92.

Heavy-duty brakes—literature describing Tru-Stop disk-type brakes for heavy-duty construction machinery, and emergency brakes for trucks and tractor-trailer combinations. Includes information on adjustment and relining, and is illustrated with drawings and photographs.

Write to the Automotive & Aircraft Division, American Chain & Cable Co., Inc., Dept. C&E, 929 Connecticut Ave., Bridgeport 2, Conn., or use the Request Card at page 18. Circle No. 85.

Compressor-tractor; others—a booklet describing and illustrating many units of Le Roi construction machinery. Includes photographs and specifications of the firm's complete line of portable air compressors; of the Tractair, a combination compressor-tractor, and attachments; of sev-

(*Continued on next page*)



Walls, Slabs, Beams and Stairways Formed with Symons Forms

8,500 square feet of Symons Forms with steel cross members, 200 column clamps and 520 shores were used by Sullivan Long and Hagerty, Birmingham, Alabama, for construction of the new $6,000,000 Jefferson County (Birmingham), Alabama, sewage treatment plant, vacuum filtration and flash drying building, and six digester tanks.

Forms were leap-frogged for successive lifts on the walls. Slab thickness ranged from five to seven inches and Symons 8-foot shores with 8-foot extensions on four foot centers were used to hold the slabs 23 feet high.

Symons Forms may be rented with purchase option. For more information on Forms, Clamps and Shores write for literature. Symons Clamp & Manufacturing Company, 4251 Diversey Avenue, Dept. M-7, Chicago 39, Illinois.

For more facts, use Request Card at page 18 and circle No. 306

One of the Heston fleet—an International L-190 with RD-406 engine, equipped with a 5-speed Fuller 5-A-62 Transmission.

FULLER Transmissions help keep mixers rolling on Heston's roughest jobs

"We are well satisfied with our 5-speed Fuller Transmissions. They see some rough service out on the job sites, and they're plenty rugged. Dependability like that is important to us, because concrete has to be delivered strictly on schedule," says Earl Geiss, Equipment Superintendent of Heston Concrete Corp., Indianapolis.

All 25 Heston trucks are equipped with the original 5-speed 5-A-62 Fuller Transmissions working behind RD-406 engines. Fuller Transmissions "put the power through" to deliver ready-mix concrete to the pour site even in the toughest sticky mud or sand off-road areas.

This satisfying performance can be yours, when you equip your trucks with Fuller Transmissions. From over 110 models available for rubber-tired equipment, you will find a Fuller Transmission designed to do *your* job better at less cost.

FULLER

TRANSMISSIONS

FULLER MANUFACTURING COMPANY, Transmission Division, Kalamazoo, Mich.

Unit Drop Forge Division, Milwaukee 1, Wisconsin • Shuler Axle Company, Louisville, Kentucky (Subsidiary) • Sales & Service, All Products, Western District Branch, Oakland 6, California and Southwest District Office, Tulsa 3, Oklahoma.

For more facts, use Request Card at page 18 and circle No. 307

eral types of Le Roi Newmatic air tools; and of CRD one-use drill bits.

Write to the Le Roi Division, Westinghouse Air Brake Co., Dept. C&E, 3716 W. Wisconsin Ave., Milwaukee 14, Wis., or use the Request Card at page 18. Circle No. 81.

Hose; fittings—a 64-page parts catalog featuring the complete line of Weatherhead brass tube fittings, hydraulic hose, hose ends, and hose assemblies. Includes a bulk hose specification chart picturing and listing over 24 types available from the firm. Catalog FC-200.

Write to The Weatherhead Co., Customer Service Dept., Dept. C&E, 128 W. Washington Blvd., Fort Wayne, Ind., or use the Request Card at page 18. Circle No. 76.

Wire-rope cutter—literature describing the Hydrashear, a self-contained hydraulic pressure unit for cutting wire rope. Text stresses the speed and simplicity with which the unit operates. Three models are described and illustrated. General specifications; prices.

Write to the Pell Cable Cutter Co., Dept. C&E, 55 New Montgomery St., San Francisco 5, Calif., or use the Request Card at page 18. Circle No. 38.

Electrode holder—a bulletin describing the Lincoln Cooltong fully insulated 300 and 400-amp electrode holder. Stresses such features as Fiberglas-reinforced handle, high conductivity, permanently tight cable connection, and operator comfort. Includes a cutaway drawing of the unit; specifications.

Write to The Lincoln Electric Co., Dept. C&E, P. O. Box 3115, Cleveland 17, Ohio, or use the Request Card at page 18. Circle No. 90.

Bituminous distributor—a folder on the Littleford Model D Spray Leader bituminous distributor. Details of the unit's construction and performance characteristics. Contains a heating system comparison chart; a table of standard tank capacities, sizes, and weights; and data on mounting on various type trucks. Photographs, drawings, complete specifications.

Write to Littleford Bros., Inc., Dept. C&E, 457 E. Pearl St., Cincinnati 2, Ohio, or use the Request Card at page. 18. Circle No. 97.

Reversible electric drills — a folder featuring the new series of Thor reversible heavy-duty electric drills. Details the design of the new Thor EN series of 5/8, 3/4, 7/8, and 1-inch reversible portable electric drills. Also includes data on the EL and EJ electric drill series, screwdriver-nutsetters, and impact wrenches. Photos, specifications.

Write to the Thor Power Tool Co., Dept. C&E, Prudential Plaza, Chicago 1, Ill., or use the Request Card at page 18. Circle No. 64.

Versatile compactor—a booklet entitled "Compact Facts about the New and Revolutionary System of Duo-Paction". Explains by illustrations and diagrams how the combination of pneumatic and steel rolls in a self-propelled unit enables the Duo-Pactor to do the work of two or more separate types of equipment, and how the alternate action of rubber and steel rolls produces higher densities with big power savings. Form No. 12.

Write to the Seaman-Gunnison Corp., Dept. C&E, 2763 S. 27th St., Milwaukee 15, Wis., or use the Request Card at page 18. Circle No. 87.

Tractor shovel—a brochure on the 2-cubic-yard Trojan Model 154 tractor shovel. Details construction and operating benefits. Drawings, action photos, specifications, and a list of standard and optional equipment.

Write to the Yale & Towne Mfg. Co., Contractors Machinery Division, Dept. C&E, Clinton St., Batavia, N. Y., or use the Request Card at page 18. Circle No. 46.

Use the Request Card at page 18 to obtain any of the literature described in this section.

Drill bit grinding—an illustrated brochure dealing with problems encountered in percussion and rotary rock-drill bit grinding. Answers questions such as when to grind, how to grind, and how to best select grinding wheels for grinding rock drill bits. General recommended specifications for machine grinding.

Write to the Bay State Abrasive Products Co., Dept. C&E, 15 Union St., Westboro, Mass., or use the Request Card at page 18. Circle No. 39.

Mobile radio power systems—a folder describing three Onan packaged power systems for mobile communications equipment. Specific Onan electric plants are recommended, and an easy-to-follow chart cites uses and advantages of each system. Photos, drawings, general specifications.

Write to D. W. Onan & Sons, Inc., Dept. C&E, 2515 University Ave., S. E., Minneapolis, Minn., or use the Request Card at page 18. Circle No. 48.

Specialized tools—a service bulletin featuring a wide range of Owatonna hydraulic and manual tools designed specifically for Caterpillar equipment. Also features a Caterpillar serviceman's tool set, plus other specialized items. Bulletin CT57.

Write to the Owatonna Tool Co., Dept. C&E, 381 Cedar St., Owatonna, Minn., or use the Request Card at page 18. Circle No. 47.

Crawler, wheel-type tractors—a generously illustrated catalog on the John Deere Models 420 and 320 utility wheel-type tractors, and the Model 420 crawler-type unit. Contains a comprehensive and detailed description of all three models. Drawings, on-the-job photos, engine-performance chart. Complete specifications.

Write to the John Deere Industrial Division, Dept. C&E, 3300 River Drive, Moline, Ill., or use the Request Card at page 18. Circle No. 42.

Shovel dippers—a well illustrated catalog on Esco shovel dippers. Construction details and specifications for several models, including general purpose, heavy-duty, quarry, hopper-type, and Fastback backhoe dippers. Also contains helpful dipper selector guide.

Write to the Electric Steel Foundry Co., Dept. C&E, 2141 N. W. 25th Ave., Portland 10, Oreg., or use the Request Card at page 18. Circle No. 43.

perfect timing . . .
all the time . . . with
KOTAL STOCKPILE MIX

KOTAL STOCKPILE MIX makes winter patching a cinch. And because Kotal can be stockpiled for immediate use, cracks and holes caused by freezing temperatures and snow "kickouts" can be held to minimum repair costs — caught and patched before they enlarge and cause heavy damage.

KOTAL STOCKPILE MIX IS EASY TO STOCK. It is formulated to "stand ready" even in freezing temperatures, making it possible to stockpile and keep in readiness for any repair job regardless of size.

KOTAL STOCKPILE MIX IS EASY TO WORK. Whenever it is called into action, it responds with an ease and workability that is the marvel of the industry.

KOTAL STOCKPILE MIX IS TOUGHER. Patches made with Kotal Stockpile Mix eliminate repatching. One Kotal Patch does the job because Kotal is more durable — won't kickout — it's permanent.

• Write for detailed information about Kotal's various stockpile mixes.

KOTAL COMPANY
360 SPRINGFIELD AVENUE
SUMMIT, NEW JERSEY

For more facts, circle No. 308

Advance with McCarter

M-5000 STACK-UP

A REVOLUTIONARY NEW ASPHALT PLANT

HIGHER CAPACITY • LOWER COST

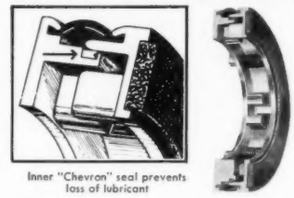
Ruggedly built McCarter plants are tops in speed, production and portability. Advanced designing and flexibility guarantee lasting profitable service.

▶ M-6000 STATIONARY
Capacities of 150 to 200 T.P.H.
▶ M-5000 STACK-UP
Capacities of 100 to 135 T.P.H.
▶ M-2000 PORTABLE
Capacities of 60 to 70 T.P.H.

THE Mc McCARTER IRON WORKS, INC. NORRISTOWN, PA.

For more facts, use Request Card at page 18 and circle No. 309

Sure-Seal®
ROLLER SEALS
Double Protection
For "Cat" and I.H.C. Tractors



Inner "Chevron" seal prevents loss of lubricant

Rollers on Caterpillar and International Harvester tractors are doubly protected against lubricant loss with Sure-Seal Roller Seals. In addition to tough, oil-resisting bellows seal, there is an exclusive inner "chevron" seal. Keeps lubricant in—dirt and water out. High pressure lubrication seals it tighter — can't blow out!

Other Sure-Seal features: Heat-resistant leather facing. Double-tanned, chemically treated for heat and wear resistance. Equal-pressure, self-aligning springs. Protect your tractor with Sure-Seal.

"Locks Grease In — Dirt Out"

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Sure-Seal Equipment Co.
1820 N. W. 25th Ave., Portland 10, Oregon

For more facts, circle No. 310

distributor doings

Florida Equipment Co. adds Dorsey Trailer line

Florida Equipment Co., Jacksonville, Orlando, Tampa, and Miami, has been made a distributor for the complete line of Dorsey low-bed machinery trailers.

Dorsey makes trailers for any hauling requirement, and capacities range from the 10-ton Model "MK" to the 75-ton Model "MT".

The parent office in Jacksonville, headed by I. E. Mercer, is located at 10 Stockton St. The branch in Orlando at the intersection of Highways 50 and 15A is managed by Carlton Crenshaw. H. C. Rowe is manager of the Miami branch, located at 1228 S.W. First St. This office has a shop at 3367 N.W. North River Drive. In Tampa, the office is located at 1108 Twiggs St., and Bruce Morehead is manager.

B&D demonstration bus travels to Western dealers

A new Tool-orama bus, designed to spur sales for the Black & Decker Mfg. Co., Towson, Md., has been touring the B & D dealer offices in the southern California, southern Nevada, and Arizona areas.

From this bus, members of the company give on-the-spot power tool clinics, showing the use and care of the tools, and the variety of operations each tool will perform. There is also a display of the company's product line inside the bus.

A dealer in the area covered may obtain the service of Tool-orama either through his wholesaler salesman or by contacting directly the Black & Decker branch at 2432 S. Broadway, Los Angeles, Calif.

Littleford appoints

Littleford Bros., Inc., Cincinnati, Ohio, has appointed a dealer, the West Virginia Tractor & Equipment Co., 1701 Mercer Ave., Charleston, W. Va. The dealer will handle Littleford's Heater-Planer, Trail-O-Dryer, Utility Spray Tank, Trail-O-Roller, Road Broom, True-Lay paver-spreader, and small paving tools.

The T. B. McShane Co., Inc., 1113 Howard St., Omaha, Nebr., also named a new dealer, will handle the complete line of Littleford road construction and maintenance equipment.

Midwest dealer for Yaun

William D. Harrell Co., Slavin Bldg., 8000 Bonhomme Ave., Clayton, Mo., has been appointed a Midwest representative for Yaun Mfg. Co., Baton Rouge, La. The dealer will handle Yaun dragline, clamshell, rehandling, and concrete buckets.

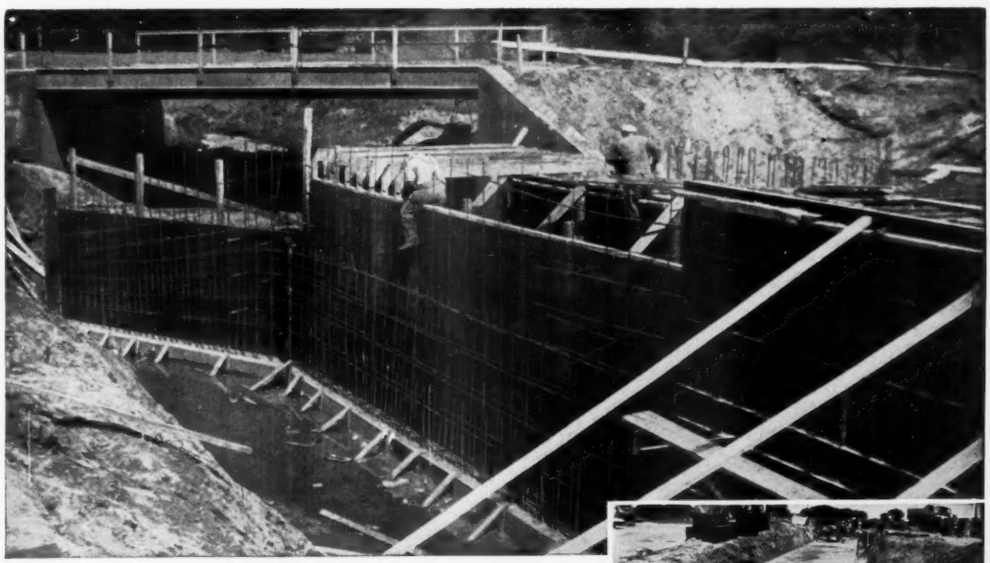
P&H equipment show features giant crane

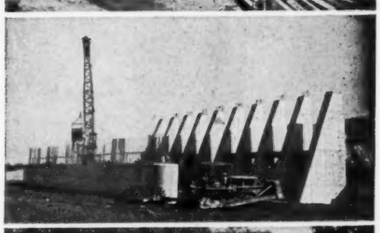
A two-day display of Harnischfeger Corp., Milwaukee, Wis., equipment, at the Los Angeles headquarters of Brown-Bevis Industrial Equipment Co. marked the West Coast showing of P&H's gigantic Model 575-TC over-the-highway truck crane. The 45-ton model was specifically designed by Harnischfeger to meet the needs of the highway program for an extra-high-capacity truck crane.

The show, which included the entire line of P&H power shovels and truck cranes, also featured films of P&H equipment in action, cutaway models, and display panels.

(*Continued on next page*)

A variety of P&H cranes was assembled for a showing at the Los Angeles, Calif., headquarters of Brown-Bevis Industrial Equipment Co.





forming Bridges, Culverts, Piers?

UNI-FORM PANELS

Save LABOR, MATERIAL, TIME!

Simple mechanical assembly and pre-engineered techniques for handling virtually any forming condition make UNI-FORM Panels your best bet for fast, low cost forming. Successful contractors everywhere are using the UNI-FORM system to form bridges, overpasses, culverts, piers and abutments, because their experience has shown that UNI-FORM Panels give them the speed, flexibility and economy required to handle this complex type of forming at the lowest possible cost.

Let us prove our point. Send a set of plans for detailed forming specifications, recommendations and cost analysis. There's no obligation, of course.

P1501

UNIVERSAL FORM CLAMP CO.

Concrete Form Specialists Since 1912

1238 North Kostner Avenue, Chicago 51, Illinois

BRANCH OFFICES AND WAREHOUSES

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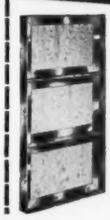
DISTRIBUTORS IN PRINCIPAL CITIES

Here Are The Basic Elements:



2. UNI-FORM Tie

3. UNI-FORM Tie Key

1. Steel framed, plywood faced UNI-FORM Panel

For more facts, use Request Card at page 18 and circle No. 311

distributor doings

(Continued from preceding page)

Pioneer Engineering news

Pioneer Engineering, Minneapolis, Minn., has appointed Spreitzer, Inc., Cedar Rapids, Iowa, a distributor in the southeastern section of Iowa and Rock Island County, Ill. The distributor will carry Pioneer's line of portable and stationary aggregate-producing equipment, Continuflo bituminous mixing plants, and the Vibromatic pavers.

O. R. Brogdon appointed Boardman vice president

Orville R. Brogdon has been appointed vice president and general manager of Boardman Machinery Co., Oklahoma City, Okla. Boardman is statewide distributor for Allis-Chalmers construction machinery, P&H shovels and cranes, Tractomotive equipment, and other heavy machinery.

Industrial Equipment opens new building

A new building opened by the Industrial Equipment Co., Billings, Mont., has a 6,000-square-foot service shop and a used-equipment shop with a separate work space of 7,000 square feet.

Adequate parts space has been provided for a complete parts stock in the over 5,000-square-foot parts department.

Metalweld, Inc. appoints

Charles C. Antle has been appointed to handle contractor accounts in Chester County, Pennsylvania, and the state of Delaware, for the construction equipment division of Metalweld, Inc., Philadelphia, Pa. Antle, a civil engineer turned salesman, will service contractor needs for such equipment as that made by International Harvester, Hough Co., Drott, Worthington, Lima, Pitman, and Erie Strayer.

Also, John Sardarian has been made service manager. He will be succeeded in his former post of assistant parts manager by Theodore T. Roberts.

State Equipment news

Anthony Hummel has joined the State Equipment Co., Philipsburg, Pa., as service manager. He entered the equipment business ten years ago. State Equipment distributes machinery in Pennsylvania, New York, and Vermont.

Warner & Swasey appoints

The Caprock Machinery Co., Amarillo, Texas, has been appointed as exclusive distributor by the Gradall Division, Warner & Swasey Co., Cleveland, Ohio. Caprock will cover the northwestern part of Texas.

SWENSON SPREADERS FOR ICE CONTROL

SPREADS SALT 200 LBS. PER MILE OR IN ANY DESIRED AMOUNT
Lays a Narrow Strip or Full Traffic Lane

Handles all granular materials — salt, cinders, sand, calcium chloride, rock chips. Spreads at speeds up to 30 M.P.H. Clutch-controlled flow: steady or intermittent for hills and intersections.

Write for complete information

SWENSON SPREADER & MFG. CO.
LINDENWOOD, ILLINOIS

For more facts, use Request Card at page 18 and circle No. 312

IN '58, Contractors and Engineers will publish

3 KEY CONVENTION DAILIES

1. **ARBA Daily** — Daily newspaper coverage of the important American Road Builders' Association meeting and the exhibit sponsored by the Materials and Services Division —

Dates of issues: January 20, 21, 22 — at Washington, D. C.

2. **AED Daily** — The news of the construction industry *while it's news* during the annual, nationwide get-together of dealers and manufacturers at the Associated Equipment Distributors' convention and exhibit —

Dates of issues: January 27, 28, 29 — at Chicago, Illinois

3. **Sand & Gravel — Ready Mixed Daily** — On-the-spot daily coverage of the joint meeting and major equipment exhibit sponsored by the National Sand & Gravel *and* National Ready Mixed Concrete Associations.

Dates of issues: February 10, 12, 13 — at Chicago, Illinois

Distribution: 5,000 copies each day at each convention. Majority circulation to the hotel rooms of delegates. Copies also available in registration area, outside meeting rooms, etc. Plus carefully selected first-class mailing of copies to home offices of leading firms.

Advertising Units Available: Standard 7 x 10s and spreads plus conventional ⅔ and ½ page sizes. Also full C&E size page (11 x 15) for maximum impact.

Write to CONTRACTORS AND ENGINEERS for 4-page, illustrative dummy or for review copy of highly successful "Road Show Daily" published last January. Also, please let us know if you would like your home office to receive copies of one or more of the 1958 Convention Dailies by mail.

The 1958 Convention Dailies are a service to the construction industry sponsored by —

Contractors and Engineers
magazine of modern construction
470 Fourth Avenue, New York 16, N.Y., MUrray Hill 5-9250

CHICAGO 6, ILLINOIS — 2111 Daily News Bldg. (Central 6-2853)
CLEVELAND 14, OHIO — 603 The Arcade (Cherry 1-1755)
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LOS ANGELES 22, CALIF. — 1870 Hilhurst Avenue (NOrmandy 5-5143)
LONGBOAT SHORE, TEXAS — 121 North Hermitage (Taylor 1-2853)

For more facts, use Request Card at page 18 and circle No. 313

FOUNDATION CONSTRUCTION

CAISSONS
DRILLED AND UNDERREAMED
PIERS

SPECIAL DRILLING PROBLEMS

Offices in Atlanta, Ga., Pittsburgh, Pa., Washington, D.C., Cleveland, Ohio

Wire or phone for a quotation on your next foundation job —
ANYWHERE IN THE WORLD

McKINNEY DRILLING COMPANY
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Ph.: LOgan 4-8373 • P. O. Box 190

For more facts, circle No. 314

management

Planning and production:

Expediting materials

This is the twenty-fourth of a series of articles on Construction Management by George E. Deatherage, P. E., construction consultant. The articles are based on an eight-volume "Manual of Advanced Construction Management" published by Geo. E. Deatherage & Son, P. O. Box 921, Lakeworth, Fla. The manual is used in a training course for superintendents and project managers, and is directed primarily at those contractor employees who have reached the foreman level or its equivalent, and who need practical help in order to take complete charge of construction projects themselves.

by **GEORGE E. DEATHERAGE, P. E.**
construction consultant

Often overlooked in the scheduling of various phases of construction work is the importance of having materials delivered only when needed. If the materials or equipment are delivered far ahead of schedule, it may mean extra handling, protection, and storage—items not included in the cost estimate.

It is best to have the material arrive exactly when needed at the work site. If, for instance, structural steel for a building, bridge, or other structure can be delivered to the site by truck at the right time and in the proper sequence, the handling cost is reduced to its lowest terms.

The careful estimator will be sure that he has covered his cartage and unloading costs on all items, and provide for storage and temporary handling on items which have to be handled more than once. Such a material is dimension lumber purchased directly from the sawmill in truck or car lots. In the majority of cases, this lumber has only been air dried for a few days, if at all. When it arrives on the site the lumber has to be crosspiled to be air dried before use, or it will warp out of shape and be practically useless.

Time scheduling, expediting

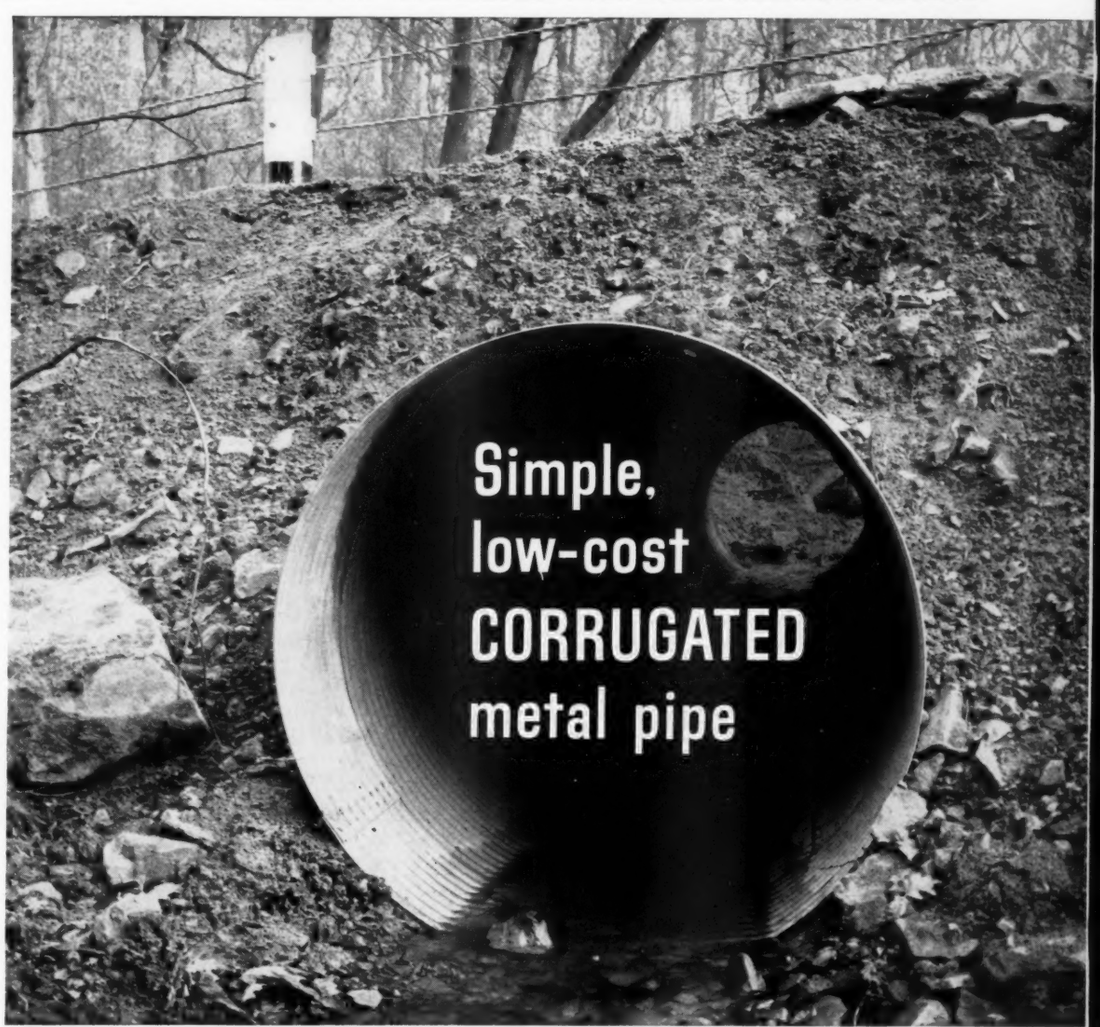
Efficient expediting depends a great deal on information that the expeditor has to work with. A time schedule is needed, and this may be simple graphic schedules revised from time to time in accordance with job progress, setbacks, weather conditions, strikes, or other factors which may delay or speed up construction.

On simple building work and many types of heavy construction, one might use "Combination Job and Office Schedule Materials Control Sheet". The job starting and stopping dates can be arrived at from the simple graphic schedules or may even be posted directly on the sheet, with all the items in the proper job erection sequence, and the delivery date posted after the item.

This form provides space in which the requisition number, vendor's name, and the purchase order number may be posted opposite each item.

(Continued on next page)

For more facts, circle No. 315→



Culvert on New Kensington, Pa. by-pass. Fabricated from USS Galvanized Corrugated Culvert Sheets by United Steel Fabricators, Inc., Wooster, Ohio. Installed by Adam Eidemiller Construction Company, Greensburg, Pa.

stands up under heavy loads!

Structures made from USS Galvanized Corrugated Culvert Sheets provide a permanent, speedy and economical means of handling road and highway drainage problems. They readily absorb the impact and vibration of modern traffic and can carry heavier loads than rigid-type structures.

These advantages, plus the fact that corrugated metal culverts are not subject to breakage, require no maintenance, cost less to install and are easy to ship and handle, make them ideal for most drainage applications.

For larger drainage structures

USS AMBRIDGE SECTIONAL PLATE is available in a complete range of standard sizes to satisfy design requirements for various types of terrain and waterway openings. These flexible structures with their heavy-duty corrugations can resist extremely large externally applied loads.

• • •

For detailed information, ask for a copy of our 28-page catalog. Send your request to American Bridge Division, U. S. Steel Corporation, Room 1801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS GALVANIZED CULVERT SHEETS

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

7-1004

UNITED STATES STEEL

Construction camera

Civil Engineering students at Cleveland's Case Institute of Technology see a good demonstration as two new buildings rise on the campus. A Lorain 35-ton Moto-Crane, with boom and jib totaling 135 feet, is setting steel that will be encased in reinforced concrete for the 3-story auditorium and physics buildings.

The third pour finishes a section of the double tank addition to a sewage-treatment plant in Columbus, Ohio. The chamfered portion was poured about two feet above the floor slab. Then the wall section, extending 10 feet above the chamfer, was poured with Symons form panels.

The world renowned

BENOTO EDF 55

caisson excavator . . .

digs deep shafts efficiently through any kind of ground without disturbing the stability of the successive soil layers. With a crew of four or five men the BENOTO EDF 55 easily digs 40-inch shafts 115 feet deep to bedrock through 30 feet hardpan in 15 to 20 hours. It digs vertical or up to 15-degree batter shafts with equal precision and ease.

HOW IT WORKS:

1) The BENOTO eases a continuous column of 20-foot-long sections of heavy steel casings into the ground by a hydraulically-smooth twisting and thrusting action. A cutting edge on the lead section drills the shafts through the ground, while

2) A HAMMER-GRAB, falling freely within the casing, cuts into any kind of soil, grabs the muck, and hoists it out for disposal.

Digging is usually driven down to the bedrock or, if so desired, into the bedrock itself 2 or 3 feet deep thus giving perfect anchoring and increased bearing capacity.

3) As the concrete is placed the withdrawn casing can be manipulated to ram the concrete against the wall of the shaft producing a corrugated surface pile of increased skin friction, hence a higher bearing capacity.

MANEUVERS on the site easily by OTARY device comprising 4 lifting shoes and 2 skids.

TRANSPORTS EASILY folded on a gooseneck trailer.

PROVED AROUND THE WORLD OVER 20 YEARS . . .

FOR DETAILS CONTACT:

BENOTO inc.

224 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILL.

TELEPHONE: WAbash 2-2961

For more facts, circle No. 316

(Continued from preceding page)

This does not provide space for recording deliveries, but remarks may be sufficient for that purpose.

Every item needed for the work, or to be used in performing the work, should be scheduled and expedited. The responsibility for seeing that all required materials are covered by a requisition or purchase order may be delegated to various persons in the contractor's office. At times it may be left to the project manager or superintendent to order material as he needs it. On a large and well organized job, this entire duty is taken over by the planning and production department, which sees that every single item required is covered by a requisition to the purchasing department or supplied from stock.

The first item of "what is to be expedited" is a complete Bill of Material, the basis for requisitions. The estimate is rarely accurate enough to use for purchasing and rarely carries sufficient specification data. Billing the material for purchase can be done haphazardly or systematically at one time. It is best to use a Bill of Material form so that the job is done and under a single authority.

There are numerous expediting systems, a great many of them involving intricate card files and cross files. A single sheet, the most simple and efficient, is headed with every item of material in the estimate, even before the material is billed or requisitioned. The description of the material is written in the space marked "item".

After the material is listed in detail on the expediting sheet, together with a brief specification, the covering requisition is posted. The date the material will be needed is secured from the time schedule; this date and the delivery promised date can be seen at a glance.

As the requisition is written, the date an item is needed is entered and the purchasing department secures a promised delivery date on that basis. The name of the vendor and the purchase order number are entered on the line headed "P. O. No.". The expediter using his complete file of expediting

easy, low loading

for low traction equipment

on the MILLER Model BT-10 Tandem!

A ground hugging platform . . . made possible by suspending it between single wheels mounted in tandem . . . allows an exceptionally low angle when tilted . . . provides such easy, "low" loading, that even rollers with their limited traction can be loaded by ONE man in less than two minutes. This faster, easier loading, plus easier backing and close quarter maneuverability . . . saves the bother and expense of larger, more cumbersome trailers . . . so often impractical to use for "fast jump" job-to-job hauling.

For handling dozers, loaders, backhoes, rollers and other construction equipment—you can't beat a MILLER Tilt-Top — see them at your distributor today!

Capacity 10 Ton $1,630.00*
*F.O.B. Milwaukee
Complete with platform and tires. Any optional equipment extra.
*Plus 10% Federal Tax

built best
priced best

See your MILLER distributor or write for FREE literature to:

Miller® Tilt-Top Trailer Inc.

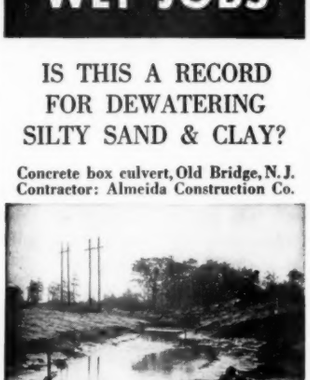
456 S. 92nd St., Milwaukee 14, Wisc.

For more facts, use Request Card at page 18 and circle No. 317

HOW TO HANDLE WET JOBS

IS THIS A RECORD FOR DEWATERING SILTY SAND & CLAY?

Concrete box culvert, Old Bridge, N. J.
Contractor: Almeida Construction Co.



PHOTO, JUNE 1—Griffin equipment shipped that day. Difficult swampy soil required use of specially designed sand filters around the wellpoints.

JUNE 4. Wellpoint system installed over weekend and excavation well under way. Actually, the 5 ft of water was under control just 20 *minutes* after pumping started.

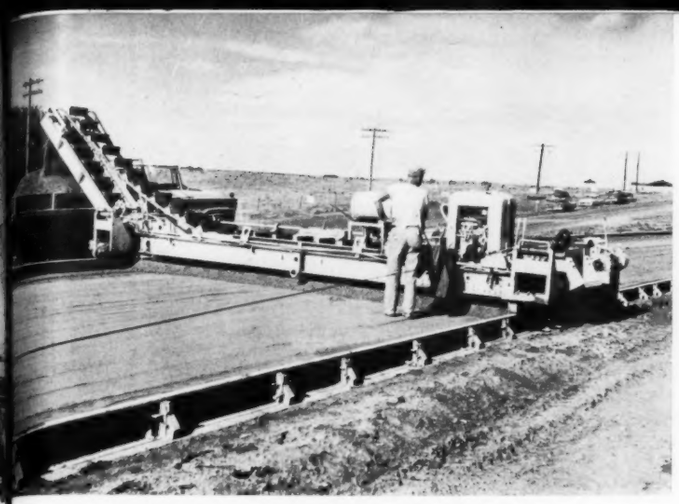
That's how skillfully the filters were designed. P. S. Almeida called Griffin on the recommendation of a contractor friend. Ask *your* friends about Griffin.

GRIFFIN WELLPOINT CORP.

881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.

In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax

For more facts, circle No. 318



The cost of rehandling excess base material during relocation work on State Route 36 near Marysville, Kans., is pared down by the Blaw-Knox subgrader used by Koss Construction Co., Des Moines, Iowa. The extra-long horn extension on the equipment loads the material directly into a truck.

A new grade is cut for a section of U. S. 411 near Sevierville, Tenn. A Marion shovel is loading rock and dirt out to a Euclid 22-ton rear-dump on this job, which includes widening, realigning, and paving. The contractor is Harrison Construction Co., Alcoa, Tenn.

sheets covering all items on the estimate—or even in the design report—can tell what items have not been requisitioned or purchased. These will not have the name of the vendor or the requisition number posted. This is a check on purchasing.

In this system, the expediter should receive copies of all Bill of Materials' requisitions, purchase orders, reports, correspondence, and shipping papers relative to all material items. These are kept in the same folder with the expediting sheet so that a complete record is always available.

The advantage of this system is that all information is attached to the estimating sheet in written form. Under the space headed "Tracing Date", one can make notes of all telephone and personal conversations with regard to deliveries. It can also be used as a diary to record all contacts with the field as to further developments regarding changes in erection and planning.

It is a good practice on smaller work to have the expediter secure shop or manufacturers' drawings, as the approval of these is necessary before starting manufacture. If an engineering department exists, the drawings are better handled there.

The expediting sheet is complete only when the shipment has been properly received as attested by a receiving report. The individuals or department authorized to handle the receipt of materials vary with the size of the job and its complexity. In the most simple case, the job foreman or superintendent will sign for all materials and supervise unloading. In the larger work, this may be done by the scheduling or materials section of the planning department or the purchasing department.

It is important to abide by the rule that a separate receiving report be made out, in the required number of copies, for each individual shipment from the same vendor and which applies to only one purchase order. This is necessary because most records are of the voucher type and individual copies are necessary to complete the record.

Materials receipts fall into four classes—carload shipment, less carload freight, express shipments, and

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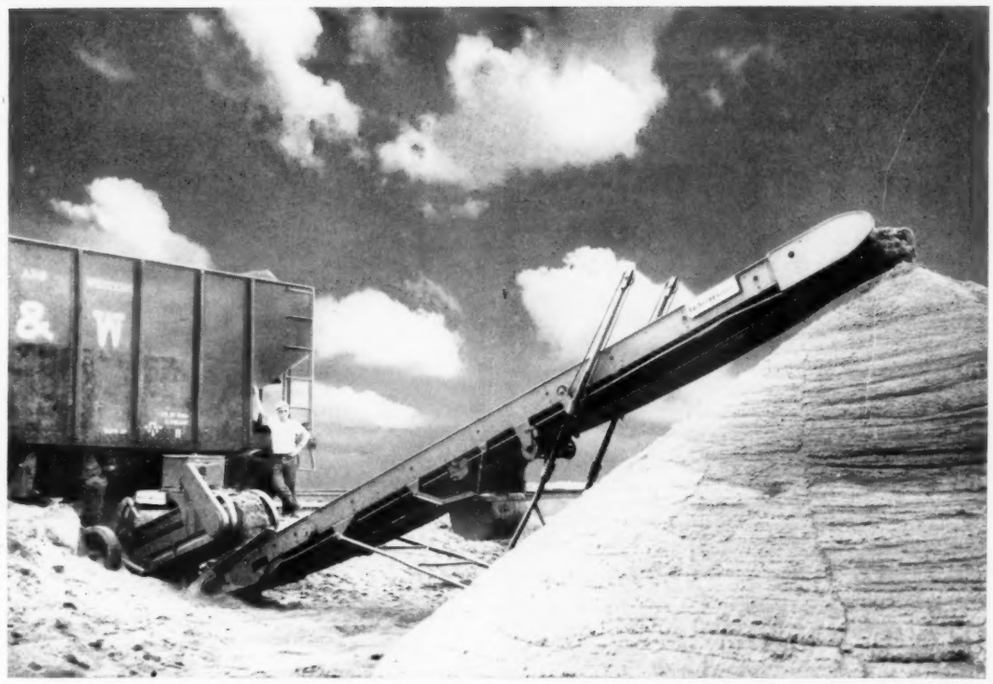


Ohio contracting firm, S. E. Johnson Co., reports:

"We unload the largest hopper cars in 45 minutes"

"Our Barber-Greene unloader and conveyor easily handle 800 tons a day with just intermittent operation. So far, we have moved over 85,000 tons of material and have had no maintenance expense to speak of."

This statement isn't a manufacturer's specification; it is a factual, unvarnished, report typical of the many comments on outstanding performance of Barber-Greene car-unloading equipment.

Wherever it's used, the combination of the 363 Portable Conveyor and the 358 Car Unloader provides a sure way to cut unloading costs and to release cranes and other, more expensive equipment for more efficient operation on other jobs. Whatever these Barber-Greenes handle—coal, sand, gravel or other bulk materials—they do the job virtually automatically as a one-man operation.

Both conveyor and unloader are mounted on pneumatic tires for easy maneuvering about the yard . . . for fast between-job towing at truck speeds.

B-G Unloader operates above or below the rails. Portable conveyor can be equipped with screens, power hoist and other accessory equipment. Capacity ranges to 150 t.p.h. Powered by gas or electricity.

56-13-PO

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

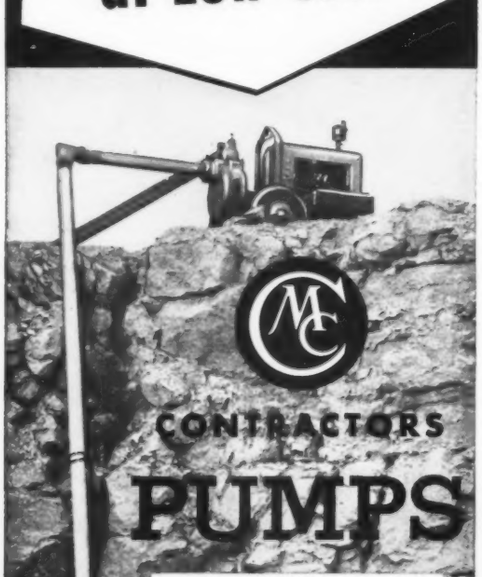
For more facts, use Request Card at page 18 and circle No. 319

Construction camera

A rig of all jobs is this Austin-Western hydraulic crane working for the Norfolk, Va., City Department of Parks and Forestry. Mounted on an International truck, which serves as a mobile operating base for the crane, it is used for pulling stumps, loading construction materials, and picking up wrecked vehicles.

A halt for servicing on the Connecticut Turnpike project is made by a Michigan Model 180 tractor-dozer. The rig is being filled with Gulf Dieselect fuel. The rubber-tire dozer handles grading and dozing for Poirier & McLane Corp., New York, N. Y., general contractor.

High Lift...
Big Performance at Low Cost



CONTRACTORS
PUMPS

Most satisfactory pumps ever designed for general purpose use — dewatering, seepage control. Dual volutes for sure, fast, automatic priming. All standard sizes from 1" to 10".

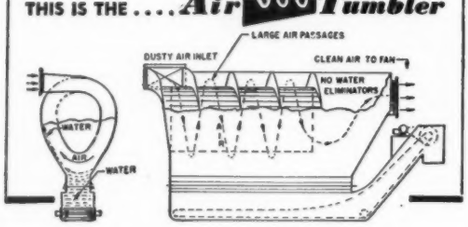
New FREE
PUMP CATALOG

WRITE FOR YOURS TODAY!

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

For more facts, circle No. 320

THIS IS THE .... Air Tumbler



the master of DUST *in industry* ★ ★ ★

SIMPLE — DEPENDABLE
NO FIRE HAZARD
HIGH EFFICIENCY
CONSTANT CAPACITY
LOW OPERATING COST

WRITE FOR BULLETIN NO. 531

DUST SUPPRESSION & ENGINEERING COMPANY
P. O. BOX 67 • LAKE ORION, MICHIGAN

For more facts, circle No. 321

NOW! Drawings, Prints and Maps Easily Filed, Quickly Located!

PLAN HOLD Ends Trouble and Cost of Damaged or Lost Prints

PLAN HOLD holds plans, prints, maps, drawings, etc., up to 48" wide – and holds them better than any other method. Standard PLAN HOLD fits most racks now in use. Also available are PLAN HOLD wall racks, rolling stands, carousel units, cabinet units, etc. Order from your Blue Printer, Engineering or Office Supply Dealer, or write for Catalog No. 7.

PLAN HOLD® CORPORATION SOUTH GATE, CALIF.

For more facts, circle No. 322

(*Continued from preceding page*)

truck shipments. On carload freight shipments, the responsibility passes to the buyer when a common carrier places the car on the site or as near to it as the traffic will permit. The checker or receiving clerk should inspect the shipment when the car is placed for unloading, if possible before unloading starts. Claims for loss or damage should be made within 48 hours. If the damage is not concealed, the unloading should not start until the freight agent has been notified, his inspection made, and the proper notation made on the Bill of Lading.

Material is actually received on less carload freight when the truckman or clerk signs the Bill of Lading at the freight station. This should not occur until the material is inspected and actually loaded on the truck. If, on arrival, the contents of the cases are found to be damaged, claims are to be made on the carrier's special form for concealed damage. This procedure also applies to express shipments.

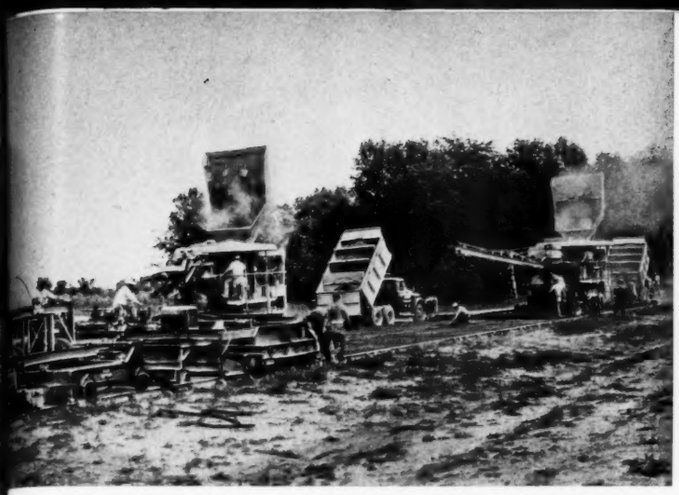
Truck shipments are actually received when the vendor's delivery slip is signed by the receiving clerk. If the material is rejected and taken back by the truck that brought it, this fact should be noted on the vendor's delivery slip. Such material should be considered not received and not covered by a receiving report.

Local vendors usually object to delaying their trucks until the consignment can be completely checked for quantity and quality. It is satisfactory to stamp the delivery tickets: "In order to avoid delaying your truck, we have permitted your driver to unload this consignment without our checking as to quantity or quality. Any shortage, damage, or other exceptions will be called to your attention for correction when we check this consignment". The contractor then signs this statement.

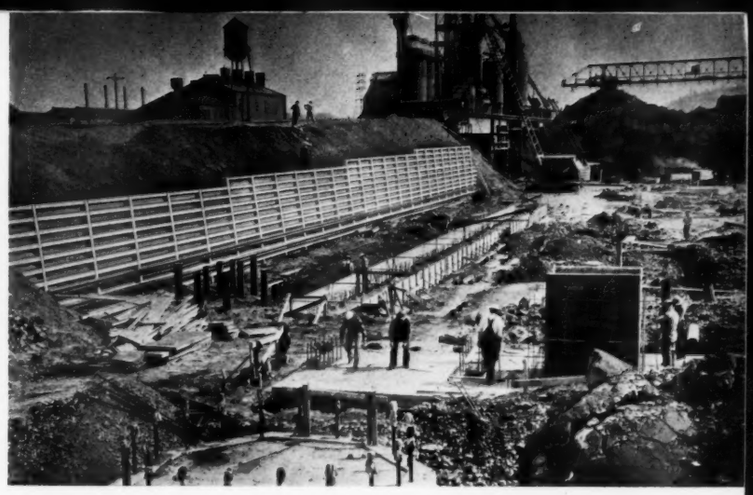
All invoices are passed for payment on the basis of information contained in the receiving reports. It is essential for the clerk to appreciate his personal responsibility for the completeness and accuracy of the reports he signs.

Filling out reports

The purchase order number should



Teaming up for a paving job on U. S. 141 north of Milwaukee, Wis., are two Chain Belt Rex dual-drum pavers powered by GM Detroit Diesel engines. The pavers work close together, the second in line laying the top lift of concrete over welded wire fabric for the four-lane north-south artery.



Foundation work for a new plant facility for Armco Steel Corp. gets under way as part of a plant expansion program. A preliminary job was installing the bin-type retaining wall for a railroad fill, left, so that an access road can be constructed at the base of the high fill for the new building.

always be filled in. If the material cannot be identified with a purchase order, it should be held unloaded until contact is made with the vendor or purchasing department and until a copy of the purchase order is received or the material is otherwise identified.

The date materials reach the site should be noted on the report. In the case of carload materials which may not be unloaded and checked the same day the car is received, the Receiving Report must bear in this space the date the car was received from the company. The body of the the report should show the date the car was unloaded and checked.

If the shipper's name differs from the vendor's name shown on the purchase order, the vendor's name should be shown above the shipper's name. One should not depend on the quantities shown on shipping papers or freight bills, as they may be in error. Bulk materials in carload—gravel, cement, and sand—should be visually checked at the scales.

(Continued on next page)

FOR **CAISSON & SUB-PIER FOUNDATION CONSTRUCTION**

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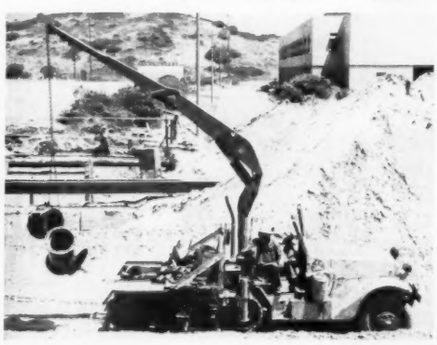
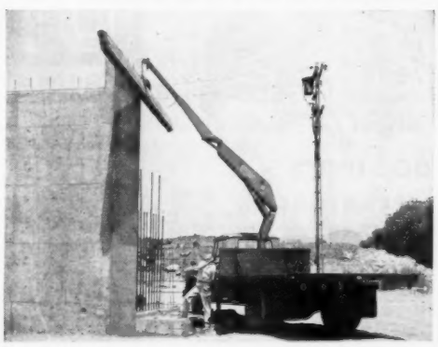
SEND FOR OUR FREE BROCHURE
"OUR BUSINESS IS GOING IN THE HOLE"

For more facts, circle No. 323

LOW COST HIAB 170 PROVES VERSATILE TRUCK CRANE FOR PETER KIEWIT & SONS CO.





On the $4,000,000 Expansion job for the Hyperion Sewage Treatment Plant in California, Peter Kiewit & Sons Co., in joint venture with Fred J. Early Co., ran into a variety of time consuming lifting, loading, unloading, and materials handling tasks. The contract included a tremendous amount of pipe work — mostly 14 inch and 8 inch cast iron — and pipe sections, fittings, valves, etc. continuously had to be moved from one portion of the job to another. Problems were complicated by the fact that the job site was mostly soft sand, requiring machinery with sufficient floatation and traction to maneuver well without bogging down, while retaining efficient lifting and loading capacities.

To do the work, the Kiewit organization purchased a versatile, fully hydraulic, one-man operated HIAB 170 Crane and mounted it on a surplus half-track truck, as illustrated. The combination proved ideal for meeting all the miscellaneous materials handling jobs on the project. The contractors reported the HIAB 170 handled loads up to 1800 pounds in the soft sand at 13 foot boom length easily and efficiently.

Peter Kiewit & Sons Co. do not limit the use of the HIAB 170 to the Hyperion job. The same model crane worked on their Southern California Gas Co. Compressor Station job in Needles, California, and the firm is contemplating the purchase of additional units for work wherever a low cost, efficient truck mounted crane is required.

The fully hydraulic, one-man operated HIAB 170 is an ideal Contractors' utility tool. It offers a range of lifting capacities from 6000 pounds on the shortened boom of 5 feet to 2500 pounds on a full boom of 13 feet. The boom length is easily adjustable through hydraulic control. The HIAB 170 will lift up to 20 feet above ground level at a maximum speed of 20 inches per second. Control is from either side of the truck cab. Crane action is positive and accurate, with 360° swing arc. When not in use, the HIAB 170 folds snugly behind the cab, taking only 15" of space. THIS LEAVES THE ENTIRE TRUCK BED OPEN FOR LOAD. Hydraulic outriggers to handle heavy loads are standard equipment.

WRITE FOR COMPLETE INFORMATION

Stanco
MFGS. & SALES INC.
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THESE HIAB DEALERS WILL DEMONSTRATE THE HIAB 170 TRUCK CRANE

SHRIVER MACHINERY COMPANY, Phoenix, Arizona; CONSTRUCTION MACHINERY CO., San Diego, California; CROOK COMPANY, Los Angeles, California; DITZ BROS., Santa Clara, California; McCORMICK & MORGAN, San Francisco, California; WIN-WARD COMPANY, Pomona, California; CONSTRUCTORS EQUIPMENT CO., INC., Denver, Colorado; ENGINEERING SALES SERVICE, INC., Boise & Pocatello, Idaho; MORRISON INDUSTRIAL EQUIP. CO., Grand Rapids, Michigan; W. B. THOMPSON COMPANY, Iron Mountain, Michigan; W. B. THOMPSON COMPANY, Virginia, Minnesota; GENERAL SUPPLY COMPANY, Kansas City, Missouri; HALL-PERRY MACHINERY COMPANY, Billings, Butte, Great Falls and Missoula, Montana; RENO EQUIPMENT SALES COMPANY, Reno, Nevada; CUMMINS RIO GRANDE SALES & SERVICE, Albuquerque, New Mexico; CRAMER MACHINERY COMPANY, Portland & Eugene, Oregon; FLINCO, INC., Salt Lake City, Utah; FERRIS EQUIPMENT COMPANY, Spokane, Washington; WASHINGTON MACHINERY COMPANY, Seattle, Washington; CRAIG TAYLOR EQUIP. & SUPPLY CO., Anchorage, Alaska; EDWARD R. BACON CO., OF HAWAII, LTD., Honolulu, Hawaii; RUDOLPH HIGUERA COMPANY, Mexico (Tucson, Arizona).

For more facts, use Request Card at page 18 and circle No. 324

Construction camera

Some 10,000 cubic yards of gravel are being produced by this Pioneer 45-VE Duplex crushing and screening plant in the Chequamegon National Forest of Wisconsin for a gravel resurfacing job of the U. S. Forest Service. Mueller Brothers, Medford, Wis., is handling the job.

Ditching along one of the residential streets in Stratford, Ont., Canada, means cutting through tangled roots of hardwood trees. This Gar Wood-Buckeye 403 utility ditcher is excavating for 59 miles of natural gas service lines, 2 to 10 inches in diameter.

(Continued from preceding page)

Carload materials rejected for quality should be reported at once to the freight agent whose duty it is to inspect and confirm the findings. If he releases the car for unloading in order to clear the car, all expense is on the carrier's account and they must remove the material within a reasonable time.

On many large jobs where there may be as many as 50 to 100 cars of material received daily, it is necessary that inspections be made at once and the material be accepted or rejected then and there. To keep the yard and unloading crews posted on the inspection results, Car Cards of heavy cardboard should be nailed to the car door following the inspection. These carry the car initial and number, the date the shipment was received, contents, remarks, and the inspection okay or rejection by the person in charge.

(Next Month's article will deal with "Planning and production: Freight transportation".)

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EVERY ROD READING AN ELEVATION

NO COMPUTATIONS

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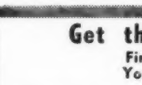
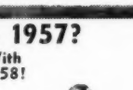
Get the COMPLETE Ellis Story in 1957?
Find Out How These Ellis Metal Parts, Used With Your Lumber, Can Cut Your Forming Costs in '58!



The Famous ELLIS SHORE CLAMP
The simplest, easiest, fastest, safest way to shore. Special pivotal plate "non-slip" design!

ELLIS SLIP-IN SHORE HOLDER
Attached to purlin, it receives the upper shore member. Use this time-saver 9/10 of time!

ELLIS HEAD CLAMP
Holds shore against purlin or head . . . low-cost way to better shoring results in suspended reinforced concrete work.



ELLIS JACK
One man, holding jack in one hand—with other hand free, can quickly adjust height of shore. No blocking or wedging.

ELLIS SHOREHEAD
Single (shown) or double . . . up fast under beams, etc.

ELLIS BEAM & COLUMN CLAMP
Squares form automatically, eliminates most cleats and framing. Adjusts from 5" to 30".

ELLIS STICK — selected dressed 4x4, cut to 7' or other standard length, ends squared, entirely painted or stained—may be used as shore member, head, purlin or joist.

If you have not already discovered this sure-fire way to increase your profits on concrete forming jobs, we urge you to forget old-fashioned shoring and adopt ELLIS METHODS. Using these simple products, Ellis Methods give you a speedy, economical, adaptable, safe job every time.

Other Ellis Products Are:
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Send us your plans and specifications, at no obligation, for suggested Ellis Methods. Write to—

Ellis MFG. CO., INC. 211 N.W. 4th STREET OKLAHOMA CITY, OKLA.

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PLASTER AND MORTAR MIXERS
5 sizes 2 to 12 Cu. Ft. Electric or gasoline. Power throw-out on smaller models, disc clutch on larger.

MULLER MIXER

3½ Cu. Ft. NON-TILTING CONCRETE MIXER
Drum 36" dia. x 27" wide. B & S Air-cooled engine 4.5 Hp. at 2700 RPM

MULLER MACHINES

4 BLADED POWER TROWELS
24", 29", 34", 44" dia. B & S Air-cooled engines. Clutch and speed controls on handle.

CONCRETE MIXERS TILTING TYPE
3, 3½, and 6 Cu. Ft. (mixed concrete) Electric or gasoline. Timken Bearings.

cost less
last longer
and produce more

Low-price, low maintenance cost and high output are combined in Muller Machines. Three major factors contribute to these qualities—seasoned experience (fifty years), specialization, and careful selection of materials and parts

Ask for prices and name of local dealer.
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UNUSED! FACTORY-NEW PERFORMANCE!

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CONSTRUCTION EQUIPMENT
766 SO. THIRD STREET • MEMPHIS, TENNESSEE

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manufacturer memos

Herbert H. Bloom, president of Case International, S. A.

Bloom elected president of Case International

Herbert H. Bloom, former president of Massey-Harris-Ferguson, Inc., has been elected president of J. I. Case International, S. A., a new wholly-owned subsidiary of J. I. Case Co., Racine, Wis. In his new position he will direct overseas operations, and supervise the company's further expansion in Canada.

William Dreier and Alexander Kovacs have also recently joined the Case organization where they occupy sales positions.

T. A. Haller has been elected vice president in charge of engineering for J. I. Case Co. Haller will head the new research and development center in Racine, and will have over-all supervision of engineering for both the agricultural and industrial divisions.

Haller is succeeded in his former post of director of engineering by P. H. Spennetta.

Frank W. Jenks, new president of the International Harvester Co.

IH elects president

Frank W. Jenks has been elected president of International Harvester Co., Chicago, Illinois. Jenks was formerly executive vice president of the company. He has been a member of the board of directors since 1952.

He succeeds Peter V. Moulder, who retired as president and resigned from the board of directors after 47 years' service for the firm.

Wayne Burnside, new sales manager of Brunner & Lay, Inc.

Brunner & Lay appointment

Wayne Burnside has been appointed sales manager of Brunner & Lay, Inc., Franklin Park, Ill., manufacturer of pneumatic accessory tools, and carbide drill bits. Burnside was formerly sales manager of Brunner & Lay Rock Bit of Philadelphia.

U. S. Rubber elects McGovern president

John W. McGovern has been elected president of United States Rubber Co., New York, N. Y., succeeding H. E. Humphreys, Jr. Humphreys will continue as chairman of the board of directors and chief executive officer.

Eugene A. Luxenberger and George R. Vila were designated as group vice presidents.

Earle Ebers and C. William Pennington were elected vice presidents.

LeT-WesCo promotes

John H. Sharda has been appointed sales training manager for LeTourneau-Westinghouse Co., Peoria, Ill. Sharda joined the company in 1942, and during that time he has worked in various positions in both manufacturing and sales. For the past five years he was district representative for the company in Illinois and Indiana.

L. B. Foster appoints

Raymond B. Johnson has joined the sales staff of the New York office of L. B. Foster Co., Pittsburgh, Pa., national supplier of pipe, steel sheet piling, and other construction materials. Johnson, who will specialize in pipe sales, has held sales positions with U. S. Steel Co.

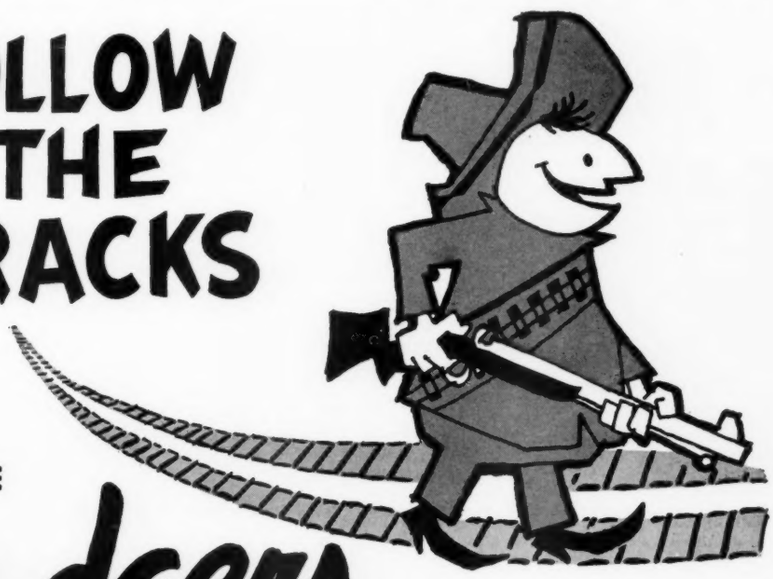
N. Kerry Patterson and Paul E. Richard have been added to the sales staff of the Los Angeles, Calif., office of the company.

New sales manager of Oshkosh Motor Truck, Inc., is Orville B. Zimmerman.

Oshkosh Motor Truck news

Orville B. Zimmerman has been promoted to sales manager of Oshkosh Motor Truck, Inc., Oshkosh, Wis. A member of the firm since 1950, Zimmerman started in the parts book and maintenance department staff, and worked in the material control department and the sales engineering division before becoming an assistant sales manager.

FOLLOW THE TRACKS



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Rodgers

NEWEST AND BEST

TRACK PRESSES

for 1958

Wait to see this *completely new '58 model press* that will service crawler tractor tracks *better* and *faster* than any other track press on the market today.

With this newest Rodgers press you will get such outstanding advantages and features as—increased production through faster working speeds, greater safety, less handling of track components, less operator fatigue. Faster controlled assembly of tracks that are flexible but accurately spaced with unbroached links will give longer service in the field.

Rodgers has pioneered in building track presses since 1932

HYDRAULICS Rodgers KEEP THE WORLD MOVING

Rodgers Hydraulic Inc.

7415 Walker Street • Minneapolis 26, Minnesota

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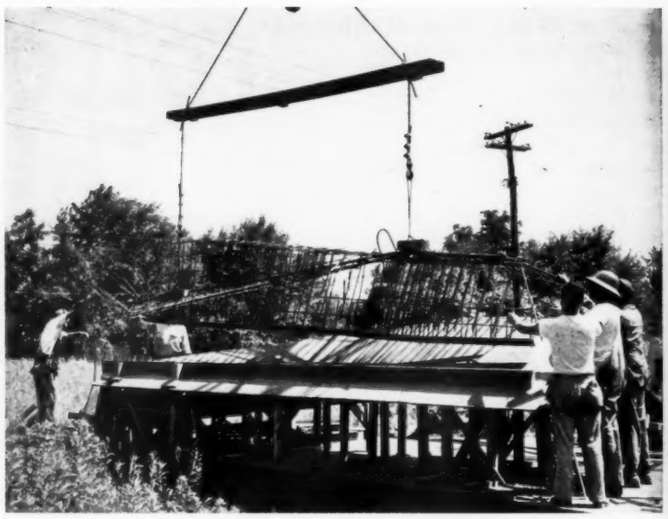
Folded plate thin-shell roof precast in 48 sections at site

Modern concepts of concrete construction found in new ACI building; cantilevered roof projects over exterior walls of precast concrete panels

A folded plate thin-shell roof is one of the many unique features of concrete construction in the new American Concrete Institute Building, Detroit, Mich. In order to build the intricate pattern of folded and refolded concrete slabs, Pulte-Strang, Inc., Ferndale, Mich., precast the roof in 48 separate sections on the ground. Saving both time and money, the contractor turned out the roof sections at a rate of two per day by using three forms set up on the site.

Designed by the noted architect, Minoru Yamasaki of Yamasaki, Leinweber & Associates, Royal Oak, Mich., the building will be the new headquarters for the American Concrete Institute. The building, at the corner of Redfern Avenue and West Seven

Workmen prefabricate a mat of reinforcing steel on a wooden form for the folded plate thin-shell roof of the new American Concrete Institute headquarters. The form served as a full-size model for the three final forms. The 48 precast roof sections were formed upside down so as to get the smoother surface on top.



The mat of reinforcing steel, being lowered onto the form, has three top bars of 1⅛-inch steel running the length of the section to form the main strength members. Their ends extend from the concrete at the center of the roof and will be welded to identical members of the opposite folded plate section.

Put this versatile DGH-100 Hammer to work on any job you have ★ you'll be amazed at the number of jobs it can handle ★ operates on compressed air or steam ★ delivers a rated striking energy of 386 pounds ★ just over 4 feet long it is readily moved about in a jeep. Illustrated here is the DGH-100 Hammer being used with a LeRoi Tract-Air breaking concrete curbing.

Manufacturers of Pile Driving Hammers and Piling Extractors Since 1852

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The Rolatape measuring wheel measures and records total as it is rolled along. Just the thing for estimating, layout work and many other measuring needs. Its one-man operation saves time and money—and accuracy is assured by its scientifically calibrated counting mechanism. Three convenient models to choose from. See your dealer or write today for free information.

1741 14th Street Rolatape, Inc. Santa Monica, California

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Mile Road, is scheduled for completion sometime this month.

The design of the building emphasizes the various uses of concrete. The roof system, cantilevered front and rear from the concrete interior corridor walls, projects over the exterior walls of precast concrete panels and glass. The shorter end walls are shielded by perforated screens of special concrete block backed by glass. The corridor is lighted by diamond-shaped skylights fitted into the roof.

The 7,000-square-foot area of the building is divided by function between the two floors. The first floor, which is enclosed by a precast spandrel wall, front and rear, will provide efficient working space for a staff of 23. The ground floor contains a library and conference room, storage space, an isolated area for office machinery, a mail room, and utilities. Space on this floor, which is about 5 feet below ground level, is divided by concrete masonry partitions and lighted by windows behind a precast-concrete lattice.

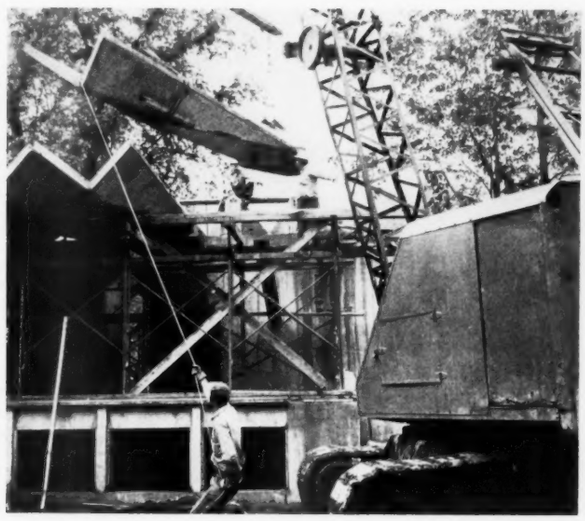
Casting roof sections

After considering the possibilities of casting the roof in place, the contractor decided to precast the roof in separate sections on the ground. By doing this, he eliminated the need for much falsework, gave the men a more convenient place to work, and was able to re-use the forms up to 18 times.

(Continued on next page)

Workmen hand-finish 4.5 feet at the end of the precast section. It was not necessary to finish the middle of the section since it constitutes the ceiling and will receive a plaster coat.

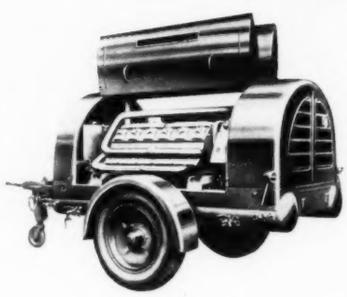
A Jaeger truck mixer dumps concrete on the platform for workmen to shovel to the form. One man uses a Stow vibrator to work the concrete down between the closely spaced reinforcing bars.



A Bay City 45 crane lowers a precast roof section into place on the corridor wall and temporary shoring. The roof will cantilever over office space that will be enclosed by precast concrete and glass.

Anti-freeze? — No thanks! — We need no coolant except air

We start and run at 40° below zero. No fuss, no feathers



D-901
320 cfm
Overall length with drawbar 12'9".

I. & E. D.-Type Compressors have the greatest capacity with the least weight.

First cost? Low **Spares cost? Lower** **Operation cost? Lowest**

AIR COMPRESSORS, INC.

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This Jaeger 2PN pumps 10,200 gph through a 2" suction line — all the water a 2" hose can handle. **With 2½" hose, it pumps 14,400 gph.**

Big New Capacities in Jaeger Pumps

Tests of latest model Jaeger "Sure Prime" centrifugals, reproducing actual job conditions, establish *new high capacities and performance never before guaranteed* to users. For example, a light Model 3XP now pumps 19,500 gph at 10′ static suction lift, the Jaeger 6P pump now has an actual performance exceeding 100,000 gph. Base your pump buying on latest information. Sizes 1½" to 10". *See your Jaeger distributor or write for catalog.*

THE JAEGER MACHINE CO., 701 Dublin Avenue, Columbus 16, Ohio

COMPRESSORS • MIXERS • PAVING SPREADERS, FINISHERS

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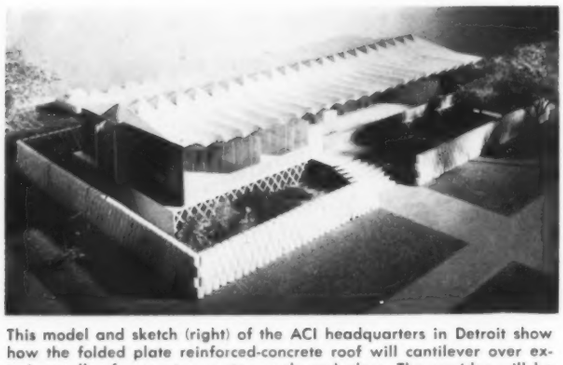

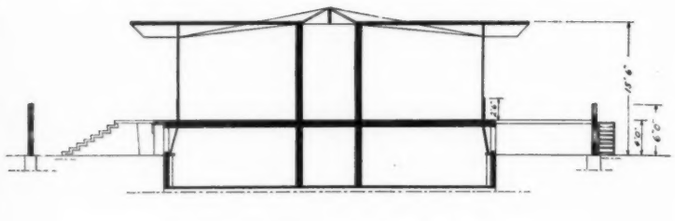

This model and sketch (right) of the ACI headquarters in Detroit show how the folded plate reinforced-concrete roof will cantilever over exterior walls of precast-concrete panels and glass. The corridor will be lighted by diamond-shaped skylights in the roof. Several minor design changes were made as work progressed; one of them calls for end screens of rectangular block rather than circular pipe.

(Continued from preceding page)

Individual sections, forming the width of the roof, are 23.5 feet long and 52 inches wide—20 feet of the length cantilevers out from the corridor wall. Each roof section is counterbalanced by an opposing roof section making up the other half of the roof.

Working on the assumption that if Yamasaki could design it, Pulte-Strang could build it, the superintendent went to work on the roof section forms. The first step in the job was to build a sturdy platform to support the three forms. This was done by placing plywood sheets on 4×4 timbers which were secured to a concrete footing.

To design a trial form, the contractor used the level surface of the plywood platform as a full scale drawing board. The horizontal projection of the odd shaped form was drawn with chalk. Using a system of batter boards, the contractor located certain key points to build in the vertical plane. In this way he was able to build a rough form, which served as a guide in building the three finished forms.

The finished forms were primarily built of vertical 2×4's supporting plywood diaphragms which were cut to fit the contour of the bottom of the form. Plyglaze, a special concrete form panel manufactured by the St. Paul & Tacoma Lumber Co., Tacoma, Wash., was used to form the sheathing. The high-density overlaid plywood forms were re-used up to 18

ROSCO'S P.M.*

makes the difference

Applying bitumen through 2 feet of spraybar as shown may not appear unusual or different, but when the operator can use any length—from 1 to 24 feet—*without changing the pressure* and *without any application adjustment whatever* . . . then there's a difference. It's *Rosco's Pressure Metering Method* that makes that difference.

The P. M. method of applying bitumen is *not* metered by the bituminous pump, nor is the amount of discharge measured in relation to the pump revolutions. Normal wear of the pump and occasional, unavoidable nozzle clogging never affect the application rate. Here again, Pressure Metering *makes the difference* . . . the rate is automatically maintained by Rosco's P. M. system.

***P. M. =**
Pressure Metering

It is this Pressure Metering Master Valve, the "heart" of Rosco Distributors, that gives you this built-in control of pressure which is the only accurate method of obtaining precise bituminous application. This is the valve that also directs the flow of material for all of the Rosco Distributor functions.

Make the difference pay off. Let your Rosco dealer show you how. Write the factory for descriptive bulletins with specifications of Distributors with P. M.

ROSCO MINNEAPOLIS

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times in making the 48 roof sections.

Steel set in cages

The intricate network of reinforcing steel was assembled prior to placing it on the form. Iron workers made up the cage of steel on the rough form used as an assembly jig. The closely knit pattern consisted of a double thickness of ½ inch and ⅜-inch bars. About 75 detailed types of steel were required per section, including bars, anchor plates, inserts, a scupper, and electrical conduit. Three 1⅛-inch steel bars, the main reinforcements, ran along the center of the section for its entire length. These bars extend about six inches out of the concrete and provided the main tie to the opposite roof section when the sections were set in place. Steel had to be assembled with a considerable amount of care for the 3½-inch thickness of the slab.

After a Bay City 45 crane placed the reinforcing cage on the form, screed bars were set to control the finished thickness of the concrete. At first, the contractor used 1-inch boards, held securely in place by Superior spreader ties, to make up the screed bars. Later, flat steel bars were substituted for the boards.

Concrete, brought in by a transit-mix truck, was shoveled by hand to the forms. The 6½-sack mix, with a maximum-size aggregate of ½ inch, contained Pozzolith No. 8. About 1½ pounds per cubic yard of Pozzolith was added to the concrete as a retarder in hot weather and as an accelerator for high early strength. Placing the concrete on the sloping surface in the tight network of reinforcing steel was a tricky business. A small Stow electric vibrator with a 1⅛-inch head was used to work around the steel. Too much vibration tended to make the concrete slide down the sloping form.

Workmen used hand floats, guided by the screed bars, to finish the surface. Since the slab was cast upside-down from its normal position in the roof, the hand-finished surface became the ceiling of the first floor.

The 4.5-foot end section, overhanging the exterior walls, was given a smooth trowel finish. The middle section, which later received a plaster coat, was rough screeded only. By casting the sections upside-down, the contractor was able to get the smoothest surface on the exposed roof.

After curing for 24 hours under wet burlap, the 4.5-ton section was lifted from the form by the Bay City crane and was given an additional week's cure under wet burlap. Working only one shift and with a fairly small crew

(Continued on next page)

PRIME-MOVER M15A FOR BUILDING CONSTRUCTION Places 12 to 17 cu. yds. of concrete per hour on school, hospital and commercial projects — *without* extensive preparations for its use. Runs on same type of ramps, hoists and runways as hand carts. Available with flatbed, or 10 cu. ft. bucket.

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M30

FOR HIGH VOLUME, LOW COST PLACING OF CONCRETE AND OTHER BULK MATERIALS — USE PRIME-MOVER POWER!

PRIME-MOVER M30 FOR ENGINEERED CONSTRUCTION

Hauls ⅔ yard or 1-½ tons. Unloads transit mixers fast. Spots concrete right where it's needed on plant, warehouse, pier and bridge construction. Hydraulic Torque Converter Drive frees the operator from shifting, clutching and wasted effort. Rugged, dependable. Bucket and flat bed.

FOR COMPLETE DETAILS WRITE TO PRIME-MOVER CO., MUSCATINE, IOWA
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Campbell Cab for . . .
"Caterpillar" D8 and D9 Tractors

HEAVY DUTY—all metal construction to withstand rugged work conditions.

FULL VISIBILITY—360° horizontal visibility.

SAFETY GLASS—windows throughout mounted in locking rubber channels minimizes vibration and breakage. Assures a weather-tight cab.

VENTILATION—doors on both sides of the cab can be locked open or removed for summer-time ventilation.

ENTRANCE & EXIT—two full doors, one on each side of the cab provide easy entrance and exit.

EMERGENCY ESCAPE HATCH—top panels inserted in rubber moulding can be knocked out from inside and used as an escape hatch in case of emergency.

Height . . 57"
Width . . 54"
Length . . 58½"

Easy to install—cab is installed by bolting to tractor fender and floor boards. Installation time—approximately 2½ hours.

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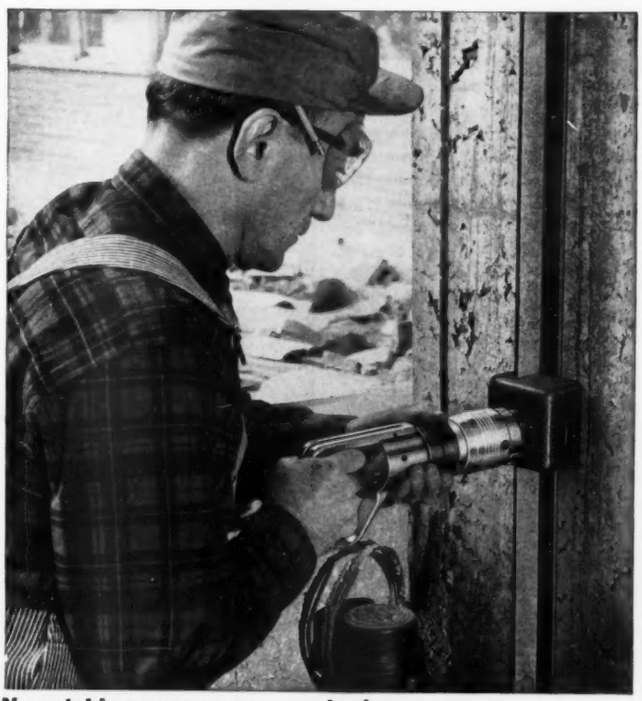
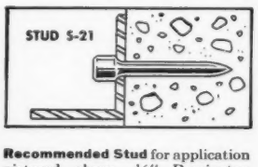
Just one of *101* Stud Driver uses!



No outside power source required —

Fasten angle iron to concrete or steel in seconds with the Remington Stud Driver



Recommended Stud for application pictured above—¼" Remington S-21 Stud with 22 caliber Power Load. Stud sets arrow-straight, iron is anchored permanently. Eliminates pre-drilling—no lost time.

Just a squeeze of the trigger anchors structural angle to concrete—without pre-drilling! This cartridge-powered fastening tool sets either ¼" or ⅜" diameter studs in steel or concrete . . . up to 6 per minute, either size. Over 40 Remington Studs to choose from, plus 22 and 32 caliber Power Loads scientifically graded to furnish *exact* power you need. Barrel change-over takes only 90 seconds *right on the job*. Take the tool anywhere, use it anywhere for light, medium or heavy-duty work. Most versatile fastening tool available!

SAVE TIME, CUT COSTS with this modern construction tool. Clip coupon for free booklet that shows how and where to use the Stud Driver.

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DUPONT
STUD DRIVER

Industrial Sales Division, Dept. CE12
Remington Arms Company, Inc.
Bridgeport 2, Conn.

Please send me your free booklet which shows how I can speed the job and save with the Stud Driver.

*Name*_____ *Position*_____
*Firm*_____
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*City*_____ *State*_____

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of men, Pulte-Strang was able to turn out two roof sections per day.

Erecting roof sections

The Bay City crane set the roof sections with one end resting on the top of the corridor wall and the other end resting on adjustable tubular scaffolding. The ends of the opposing roof sections were joined by welding the extensions of the reinforcing steel together; the 8-inch gap between abutting ends was grouted with concrete. The sides of the roof sections were tied together by continuous welding of the top and bottom of the connection plates that were cast into the horizontal edges of each section. A vinyl plastic coat was sprayed on the concrete to waterproof the roof.

Walls of the building, formed with Economy steel panels, received unusual treatment. In the library and conference room, varying sizes of vertical half-round wood strips were screwed to the inside of the forms to make a fluted pattern on the face of the wall. Walls cast during hot weather contained Plastiment, furnished by the Sika Chemical Co., as a retarder to avoid cold joints in the decorative fluting. Precast slabs were employed to form the greater part of the first floor. Flexicore slabs span the 13 feet between the corridor and basement walls. The two hollow sections within each slab serve to carry electrical wiring as well as heat to the outside walls. The slab floor received a 2-inch topping.

Personnel

Ammann & Whitney, New York City and Milwaukee, Wis., are the structural designers for the building. Representing the architect on the project is William Rieden.

John R. Strang, vice president of Pulte-Strang, Inc., is the superintendent.

The president of ACI is Walter H. Price, and the technical director is Paul F. Rice. Taking an active interest in the construction is William A. Maples, secretary-treasurer and editor of the institute. THE END

Sherman Products news

Warren E. Henderson and William W. Wigle have been appointed sales operations manager and sales manager of field operations, respectively, by Sherman Products, Inc., Royal Oak, Mich. Henderson was formerly assistant sales manager directing advertising and sales promotion activities for Sherman Products.

Wigle, also a former assistant sales manager, has served as manager of the firm's Canadian zone and product specialist on the Sherman front-end loader.

Twin Disc names manager

Hans Taeger has been appointed European sales manager of Twin Disc Clutch A. G., the foreign subsidiary responsible for export sales of Twin Disc Clutch Co., Racine, Wis. Taeger's headquarters are at Twin Disc Clutch A. G.'s new technical branch office at Zurich, Switzerland.

Colorado Fuel & Iron honors steel industry

The Colorado Fuel & Iron Corp. has prepared a booklet describing its 14 sound-color motion pictures, which run from 15 to 38 minutes. A booklet with instructions on how these films can be obtained is available without charge from The Colorado Fuel and Iron Corp., P. O. Box 1920, Denver 2, Colo. Four of the series are: "Reinforced for Life", a 20-minute film on how concrete can be made stronger when reinforced with welded wire fabric; "Know Your Ropes", a 30-minute film on the manufacture, construction, and application of industrial wire rope; "Changing the Face of the Earth", another 20-minute film on the manufacture of grader blades from basic steel to finished product; and "Quality Unlimited", which shows how wire rope is manufactured and inspected.

Expansion Joint Institute formed by four companies

An Expansion Joint Institute, recently formed, is composed of representatives of W. R. Meadows, Inc. Presstite-Keystone Engineering Products Co., Servicised Products Corp., and Celotex Corp. The institute was formed to conduct research; to promote fair practices in the premolded joint industry; and to cooperate in the adoption and maintenance of uniform standards.

Wallace C. Fischer is president; W. E. Hagemeister, vice president; Harry G. Meadows, treasurer; and G. Gale Roberson, secretary.

The institute has published a technical manual explaining joints and their applications. A free copy of the manual, "Design Practices and Uses of Premoulded Joints in Concrete Pavements", may be obtained from the institute at 121 Hill Ave., Aurora, Ill.

Electric Steel appoints

Robert Fagot has been appointed district representative in the areas of Ohio, Michigan, and Indiana for Electric Steel Foundry Co., Portland, Oreg. He will be connected with the company's central sales division at Danville, Ill.

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28th ANNUAL CONVENTION

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Baldwin-Lima-Hamilton Corp. Construction Equipment Div. Lima, Ohio
Barber-Greene Co. Aurora, Ill.
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Blaw-Knox Co. Construction Equipment Div. Mattoon, Ill.
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L. Burmeister Div. Chain Belt Co. Milwaukee, Wis.
Butler Bin Co. Waukesha, Wis.
C & W Sales Co., Inc. Menlo Park, Calif.
Calcium Chloride Institute Washington, D. C.
Caterpillar Tractor Co. Peoria, Ill.
Chain Belt Co. Milwaukee, Wis.
Chicago Fly Ash Co. Chicago, Ill.
Clark Equipment Co. Construction Machinery Div. Benton Harbor, Mich.
Cleaver-Brooks Co. Milwaukee, Wis.
Concrete Construction Magazine Chicago, Ill.
Concrete Controls Corp. Wheaton, Ill.
Concrete Publishing Corp. Chicago, Ill.
Concrete Transport Mixer Co. St. Louis, Mo.
Construction Machinery Co. Waterloo, Iowa
Continental Motors Corp. Muskegon, Mich.
Contractors & Engineers New York, N. Y.
Cook Bros. Equipment Co. Los Angeles, Calif.
Crane Carrier Corp. Tulsa, Okla.
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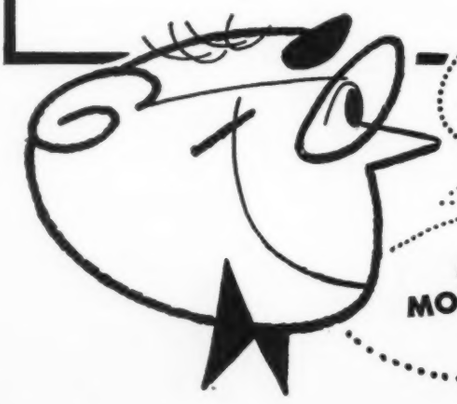
Fairfield Engineering Co. Marion, Ohio
Fleet Sales Department Ford Division of Ford Motor Co. Dearborn, Mich.
Flexible Steel Lacing Co. Chicago, Ill.
Food Machinery & Chemical Corp. Florida Division Lakeland, Fla.



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ACRES OF MONEY-MAKING IDEAS!

Show Days: Monday, Tuesday, Wednesday Thursday morning

Convention Days: Wednesday, Thursday, Friday

Note: 2 full show days free from convention meetings

The lighter side

Reveille at Glen Canyon finds TV film actors rising as early as construction workers. The Union "cavalry" and camera men line up for the bus which brings them to location near the dam site.

Construction stiffs are not the only workers who get up before dawn to start a day on a project. Dam builders at Glen Canyon pinched themselves to see if they were awake the first time they saw a troop of blue-coated Union cavalrymen come charging out of a modern motel at Kanab, Utah, early one morning this past fall. But the "soldiers", dressed up in the uniforms of the 5th U. S. Cavalry regiment, vintage circa 1870, were television actors lining up for a bus ride to location where a TV serial, "Boots and Saddles" was being filmed. The country around the dam site, with its towering cliffs and deep gorges of the Colorado River, is a favorite spot for shooting Western movies. While the cameramen were filming sham battles, they passed up the more thrilling sight of the high scalers at work on the canyon walls, and other spectacular phases of the Glen Canyon dam project.

• • •

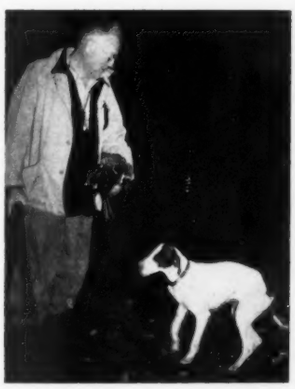
Among the 76 Americans listed by *Fortune* magazine, each with fortunes ranging from $75 million to a billion dollars, were five construction personalities, viz: Stephen Bechtel of San Francisco, building, highway and heavy contractor; Henry J. Kaiser of Oakland, Calif., a heavy contractor; Louis Wolfson, president of Merritt-Chapman & Scott Corp. of New York, and the two Browns, George and Herman, of Houston, Texas. Their contracting firm, Brown & Root, Inc., is an old advocate of the open shop in construction.

• • •

The hunting season is a busy time for Michigan contractor, Les Davidson. He has a "contract" to supply pheasants for the 50 or so guests that attend his annual game dinner early in December.

To fulfill the contract, Davidson makes a careful estimate of the number of pheasants available in Michigan. By knowing where to look for the birds and how to shoot them, Davidson often gets his limit of two cock pheasants a day. To flush out the birds, he uses his English pointers.

As the number of pheasants available in Michigan is limited, he often forms a joint venture with other contractors and flies to South Dakota. Here the combine, involving a force of 10 or 12 men, stalks the pheasants through the corn fields. After a five-day trip, the contractors return to Michigan, generally with their limit of 15 cock pheasants apiece.



Back from the hunt with a "well done" for his English pointer, Les Davidson, Michigan contractor, heads for the deep freezer with a pair of plump cock pheasants.

With the contributions from two states and the help of his brother Ken, Les Davidson has always been able to meet the deadline of his contract. Highway officials, suppliers, and fellow contractors are invited to dine on roast pheasant as well as assorted partridge and woodcock.

"Of all the contracts I have in a year", says Davidson, "the supply contract for this dinner is the most enjoyable."

Ford Motor Co.
Tractor & Implement Div.
Birmingham, Mich.

The Four Wheel Drive Auto Co.
Clintonville, Wis.

Gatke Corporation
Chicago, Ill.

General Electric Co.
Mining & Metals Sales
Development Unit
Schenectady, N. Y.

George Haiss Manufacturing
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Mulliken Corp.
New York, N. Y.

Gilson Screen Co.
Malinta, Ohio

GMC Truck & Coach Div.
General Motors Corp.
Pontiac, Mich.

Gruendler Crusher &
Pulverizer Co.
St. Louis, Mo.

Hardy Scales Co.
Maywood, Calif.

Harnischfeger Corp.
Milwaukee, Wis.

HarriSteel Products Co.
New York, N. Y.

The Heltzel Steel Form &
Iron Co., Warren, Ohio

Hendrick Manufacturing Co.
Carbondale, Pa.

Hercules Galion Products, Inc.
Galion, Ohio

Hercules Motors Corp.
Canton, Ohio

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Stamford, Conn.

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Chicago, Ill.

Iowa Manufacturing Co.
Cedar Rapids, Iowa

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Columbus, Ohio

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Hollidaysburg, Pa.

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Somerville, N. J.

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Manitowoc, Wis.

E. F. Marsh Engineering Co.
St. Louis, Mo.

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Cleveland, Ohio

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Elgin, Ill.

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Milwaukee, Wis.

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National Conveyor &
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Chicago, Ill.

Noble Company
Oakland, Calif.

Nordberg Manufacturing Co.
Milwaukee, Wis.

Northwest Engineering Co.
Chicago, Ill.

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Oshkosh, Wis.

The Owen Bucket Co.
Cleveland, Ohio

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Chicago, Ill.

Pick Manufacturing Co.
West Bend, Wis.

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Inc.
Minneapolis, Minn.

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Chicago, Ill.

Productive Equipment Corp.
Chicago, Ill.

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Camden, N. J.

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Lansing, Mich.

Richmond Screw Anchor Co.,
Inc.
Brooklyn, N. Y.

Riverside Manufacturing Co.
Moultrie, Ga.

Rock Products
Chicago, Ill.

Rockwell Spring & Axle Co.
Timken Detroit Axle Div.
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INDEX TO ADVERTISERS

(Names in italics are advertising agencies)

Acme Iron Works 76
Thomas F. Conroy, Inc.

Air Compressors, Inc. 115

Air Placement Equipment Co. 68
Carter Adv. Agency, Inc.

Allis-Chalmers, Constr. Mach. Div. 48, 49
Bert S. Gittins Adv. Inc.

American Air Filter Co., Inc. 65
Zimmer-McClaskey

American Bridge Div., U. S. Steel Corp. 53
Batten, Barton, Durstine & Osborn, Inc.

American Cyanamid Co. . . . 90
Hazard Adv. Co., Inc.

American Road Equipment Co. 54
Ayers, Swanson & Associates, Inc.

Atlas Copco 69
Intam, Ltd.

Badger Machine Co. 59
Graves & Associates

Barber-Greene Co. 109
Buchen Co.

Benoto, Inc. 108

Bethlehem Steel Co. 85
Jones & Brakeley, Inc.

Black & Decker Mfg. Co. . . 77
VanSant, Dugdale & Co., Inc.

Braden Winch Co. 22
Watts, Payne-Adv., Inc.

Buck Equipment Corp. 61

Buffalo-Springfield Roller Div., Koehring Co. 64
Curtiss, Quinlan, Keene & Peck, Inc.

Campbell Detachable Cab Co. 117
Ervin R. Abramson Adv., Inc.

Caterpillar Tractor Co. 7, 10, 15, 21, 101, cover 3
N. W. Ayer & Son, Inc.

Chevrolet Div., GMC 72
Campbell-Ewald Co.

Chicago Pneumatic Tool Co. 74, 75
G. M. Basford Co.

Clark Equipment Co. 95, cover 4
Marsteller, Rickard, Gebhardt & Reed, Inc.

Clayton Mfg. Co. 23
Franklin Associates

Coffing Hoist Div., Duff-Norton Co. 98
Bond & Starr, Inc.

Colorado Fuel & Iron Corp. 47, 116
Doyle, Kitchen & McCormick, Inc.

Construction Machinery Co. 110
Weston-Barnett, Inc.

Continental Rubber Works . 60
Eugene C. Laird, Advertising

Contractors and Engineers 106, 120

Curtiss-Wright Corp., Utica Bend Div. 79
Dobbins, Woodward & Co.

Detroit Diesel Engine Div., GMC 12, 13
Kudner Agency, Inc.

Dewey & Almy Chemical Co. 17
Kelly, Nason, Inc.

Diamond Chain Co., Inc. . . . 50
LaGrange & Garrison, Inc.

Diamond Tool Associates . . 92
Lionel & Simons, Inc.

Dudgeon, Inc., Richard . . . 81
Richmond Adv. Service, Inc.

Dust Suppression & Engineering Co. 110

Eimco Corp. 14
Matsie Co.

Ellis Mfg. Co., Inc. 112
Galloway-Wallace Adv. Agency, Inc.

Euclid Div., GMC . . 28, 29, 97
Richard T. Brandt, Inc.

Fuller Mfg. Co. 103
Curtiss, Quinlan, Keene & Peck, Inc.

Galion Iron Works & Mfg. Co. 70
Morgan Adv. Co.

Goodyear Tire & Rubber Co. 11
Kudner Agency, Inc.

Gorman-Rupp Co. 87
Fuller & Smith & Ross, Inc.

Gradall Div., Warner & Swasey Co. . . . . . cover 2
Griswold-Eshleman Co.

Greenville Steel Car Co. . . . 78
Meek & Thomas, Inc.

Griffin Wellpoint Corp. . . . 108
Monitor Adv. Agency

Gulf Oil Corp. 66, 67
Ketchum, MacLeod & Grove, Inc.

Haynes Stellite Co. 51
J. M. Mathes, Inc.

Heltzel Steel Form & Iron Co. 42, 43
Duffy, McClure & Wilder, Inc.

Hendrix Mfg. Co., Inc. 52
Svolos Adv. Service

Hobart Brothers Co. 60
Ralph Dalton & Associates

Hoffman Bros. Drilling Co. . 99
Hewitt, Advertising

Hotel Hamilton 96
Harry Atkinson, Inc.

Hough Co., Frank G. 37
Ervin R. Abramson Adv., Inc.

Insto-Gas Corp. 77
Miller Adv. Agency

International Harvester Co. 31, 32, 33
Aubrey, Finlay, Marley & Hodgson, Inc.

International Harvester Co. 19, 88, 89
Young & Rubicam, Inc.

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Announces the JANUARY

'58 FORECAST ISSUE

All of C&E's regular features PLUS FOUR BIG EXTRAS

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News and views by leaders in all segments of the construction industry focus attention on the vital issues for '58. These live interviews by C&E staff writers reflect the considered thinking of contractors, manufacturers, dealers and government officials throughout the nation.

2. PRODUCT PARADE FOR '58

Modern as the products it reports, this feature in C&E's big Forecast Issue describes the latest and the best items for '58. All product write-ups and listings of literature available are keyed for easy reader inquiry on post cards carried in every copy.

3. CONTRACTORS' PAY-ROLLS

Salary studies for contractors' supervisory personnel. Up-to-the-minute survey by C&E Research Staff is handy guide for '58 management control.

4. CONVENTION TIE-IN

January '58 C&E reaches readers shortly before three major industry meetings—ARBA, AED, and Sand & Gravel-Ready-Mixed Concrete Associations. The extra advertising carried gives unusually strong where-to-purchase value for readers.

• Last year 244 advertisers used display space in the columns of January C&E. Based on the editorial extras planned for this year an even greater volume of business is projected.

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Iowa Mfg. Co. 24
Russell T. Gray, Inc.

Jaeger Machine Co. 115
Maurice Mullay, Inc.

Jay Co. 25
Pixley Adv., Inc.

Kano Laboratories 121
Bachrodt, Newell, O'Kane & Gano, Inc.

Koehring Div., Koehring Co. 62, 63
Andrews Agency, Inc.

Kotal Co. 104
Seymour Charles, Advertising

Lenker Mfg. Co. 112

LeRoi Co. 73, 91
Hoffman & York

Lincoln Electric Co. 82
Griswold-Eshleman Co.

Mack Trucks, Inc. 44, 45
Doyle, Kitchen & McCormick, Inc.

Madesco Tackle Block Co. . 87
H. Arthur Engleman, Advertising

Marvel Engineering Co. . . . 100
Guenther-Bradford & Co.

Master Vibrator Co. 69
Yeck & Yeck

McCarter Iron Works, Inc. . 104
Hopson Adv. Agency

McConnaughay, K. E. 57
Grubb & Petersen

McKiernan-Terry Corp. . . . 20
Michel-Cather, Inc.

McKinney Drilling Co. 106

McKissick Products Corp. . . 22
Martha Stone & Associates

Mechanics Universal Joint Div. 122
Midwest Adv. Agency

Memphis Equipment Co. . . 112
Brick Muller & Associates

Meredith Drilling Co., Inc. . 111

Miller Electric Mfg. Co., Inc. 86
M & M Adv., Inc.

Miller Tilt-Top Trailer Co. 98, 108
Paulson-Gerlach & Associates, Inc.

Monarch Road Machinery Co. 121
Ben Dean Adv. Agency

Monroe Calculating Machine Co., Inc. 40
L. H. Hartman Co., Inc.

Muller Machinery Co., Inc. 112
Thoma & Gill

Murray & Tregurtha, Inc. . . 77
Roy Elliott Co.

National Sand & Gravel Association 118, 119
Maurice Mullay, Inc.

Neenah Foundry Co. 86
M & M Adv., Inc.

Plan Hold Corp. 110
Dan Ebberts Adv. Service

Plant City Welding & Tank Co. 100
Peter Larkin Agency

Prime-Mover Co. 117
Clem T. Hanson Co.

Punch-Lok Co. 96
Merrill, McEnroe & Associates, Inc.

Quinn Wire & Iron Works . 94
Lessing Adv. Co., Inc.

Remington Arms Co., Inc. . 117
Batten, Barton, Durstine & Osborn, Inc.

Richmond Screw Anchor Co., Inc. 86
Geer, DuBois & Co., Inc.

Rockford Clutch Div. 68
Midwest Adv. Agency

Rockwell Spring & Axle Co. 94
MacFarland, Aveyard & Co.

Rodgers Hydraulic Inc. 113
Foulke Agency, Inc.

Rolatape, Inc. 114
Harvey Adv. Service

Rosco Mfg. Co. 116
Foulke Agency, Inc.

Sasgen Derrick Co. 84
Symonds, MacKenzie & Co., Inc.

Shell Oil Co. 18
J. Walter Thompson Co.

Sinclair Refining Co. 34
Morey, Humm & Warwick, Inc.

Sonoco Products Co. 82
Bennett Adv., Inc.

Southwest Welding & Mfg. Co. 39
NKR Adv., Inc.

Stanco Mfg. & Sales, Inc. . . 111
NKR Adv., Inc.

Sure-Seal Equip. Co. 104
William Winter, Advertising

Swenson Spreader & Mfg. Co. 106
E. R. Hollingsworth & Associates

Symons Clamp & Mfg. Co. . 103
Marsteller, Rickard, Gebhardt & Reed, Inc.

Tarrant Mfg. Co. 61

Texas Co. (Asphalt) 5

Texas Co. (Lubricants) . . . 8, 9
G. M. Basford Co.

Thew Shovel Co. 41
Thomson Adv., Inc.

Timken-Detroit Brake Div. . 94
MacFarland, Aveyard & Co.

Transmission & Gear Co. . . 30
St. Claire Adv. Agency

Twin Disc Clutch Co. 81
Curtiss, Quinlan, Keene & Peck, Inc.

Union Metal Mfg. Co. 80
Griswold-Eshleman Co.

Unit Crane & Shovel Corp. . 58
Paulson-Gerlach & Associates, Inc.

United States Rubber Co. . . 84
Fletcher D. Richards, Inc.

U. S. Steel Corp., American Bridge Div. 107
Batten, Barton, Durstine & Osborn, Inc.

U. S. Steel Subsidiaries 53, 55, 107
Batten, Barton, Durstine & Osborn, Inc.

Universal Atlas Cement Co. 55
Batten, Barton, Durstine & Osborn, Inc.

Universal Form Clamp Co. . 105
Ross Llewellyn, Inc.

Utica-Bend Div., Curtiss-Wright Corp. . . . 79
Dobbins, Woodward & Co.

Van Brush Mfg. Co., Inc. . . 95
Kalikow Adv. Co.

Viber Co. 93
Dan Ebberts Adv. Service

Victor Equipment Co. 16
George C. McNutt, Advertising

Vulcan Iron Works, Inc. . . . 114
Kreicker & Meloan, Inc.

Vulcan Tool Mfg. Co. 76
S. Gunnar Myrbeck & Co.

Wagner Electric Corp. 83
Arthur R. Mogge, Inc.

Westinghouse Electric Corp. 35
Fuller & Smith & Ross, Inc.

Wheeling Corrugating Co. . 36
Cunningham & Walsh, Inc.

White Mfg. Co. 58
Juhl Adv. Agency

Whitmore Mfg. Co. 92
Baisch Adv. Agency

Wickwire Spencer Steel Div., Colorado Fuel & Iron 47, 116
Doyle, Kitchen & McCormick, Inc.

Winslow Scale Co. 98

Wisconsin Motor Corp. 23
Paulson-Gerlach & Associates, Inc.

Wisconsin Trailer Co. 121
Ramsthal Adv. Agency

Wix Corp. 102
Humbert & Jones, Inc.

Wrought Washer Mfg. Co. . 99
Paulson-Gerlach & Associates, Inc.

Wylie Mfg. Co., Inc. 93
Galloway-Wallace Adv. Agency, Inc.

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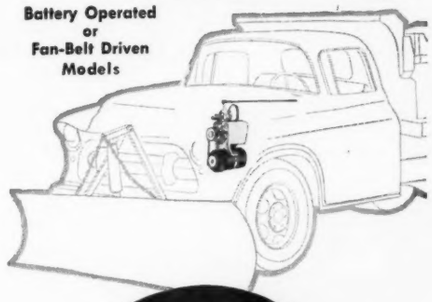

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Publisher's Postscript

The spotlight for December is focused squarely on field editor Ralph Monson, the man responsible for the six articles on the Upper Colorado storage project starting on page 22. Some of the other big name projects he has covered exclusively for CONTRACTORS AND ENGINEERS readers include the St. Lawrence Seaway and Power project, the Kansas Turnpike, Table Rock Dam, Mackinac Bridge, and the Ohio Turnpike.

Ralph joined the staff of CONTRACTORS AND ENGINEERS in 1953 to put to full use an engineering education gained at the University of Minnesota, and his flair for writing and photography. Plenty of practical engineering experience—gained while Ralph was city engineer for the City of Rochester, Minn.—serves him well when it comes to spotting and reporting on the new, useful, and money-saving techniques and machines that make a job different or important.

Ralph is best known to hundreds of men in the Midwest states whose jobs he has visited during the past five years. A few months ago, however, Ralph took up a new and even larger editorial beat for us in the Far West.

Since moving from Rochester, Minn., to San Jose, Calif., Ralph and Mrs. Monson have become proud owners of a new home, and Ralph has been issuing glowing reports about the California weather as compared to Minnesota's, and the almost total lack of insects in summer and fall. (California boosters, please notice—and you may quote!).

But chances are that editor Monson won't get to spend too many consecutive weeks—summer or winter—in his nice new home. It takes weeks of road work—and sometimes even months—to cover the significant construction projects in Ralph's present 1,187,753 square miles of territory. Days of work go into planning each trip, job story leads must be investigated, and often projects are visited that turn out to have nothing to warrant an on-the-spot story.

Meet field editor Ralph Monson, whose crackling photo of a blast in the spillway intake area at Glen Canyon Dam made the cover of this issue. Ralph is covering construction in the Far West after five years as our Midwest field editor.

Ralph likes to fish and hunt and rarely passes up a chance to do either. Whether it's a weekend on a field trip to Montana or Idaho, a holiday in Oregon, or just any day during the deer season in California, Ralph has his spinning rod and guns in the car to make the most of any possible opportunity.

Music is Ralph's principal form of relaxation. Wherever he travels, he can usually find a piano to play, but at home he spends hours finding new lost chords on his new Hammond organ. If San Jose life follows the Rochester pattern, Ralph also may shortly be beating the string bass with some local combo.

The Monsons are also pretty proud of their two sons, Ronald and Dennis, and their grandson Bruce.

Ralph gets some information from the men who know—Barrett Middleton, left, a superintendent, and Ross D. "Dutch" Bleich, general superintendent, for Kansas City Bridge Co., Kansas City, Mo.—for his story on substructure work for the Missouri River Bridge at St. Charles, Mo.

But Ralph works as hard as he plays. He is the envy of his fellow staffers for the amount of work he produces quietly, efficiently, and with a minimum of contact with the editorial office. All in all, this is a seasoned field editor, and we're mighty proud to have him as part of the hard-working CONTRACTORS AND ENGINEERS editorial team.

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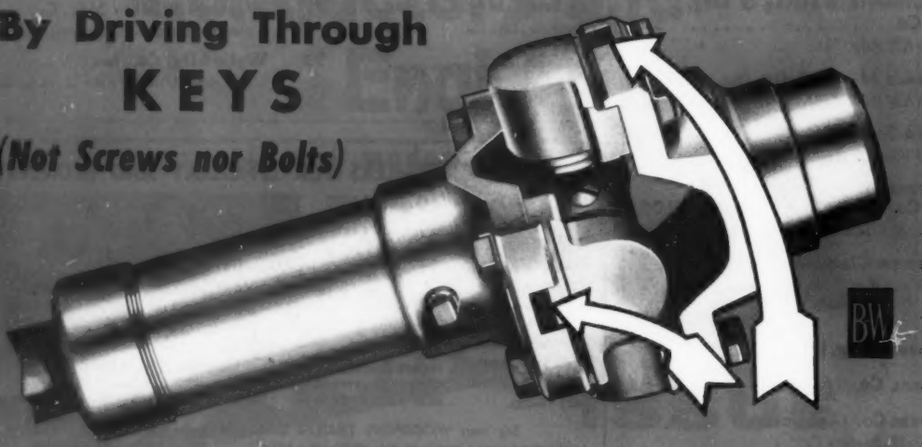
By Driving Through KEYS

(Not Screws nor Bolts)



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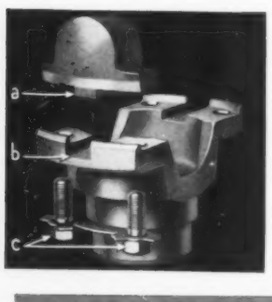

MECHANICS Roller Bearing UNIVERSAL JOINTS drive through hardened integral KEYS — not bolts nor screws that often wear loose. Heavy KEYS (a) on the bearings and corresponding keyways (b) in the flanges, accurately machined out of solid metal, transmit all of the torque. Two cap screws (c) hold each bearing securely in place against the flange. This is their only function. They are locked in position, when assembled, and have a high factor of safety. This stronger, safer, KEY method of transmitting the torque in MECHANICS Roller Bearing UNIVERSAL JOINTS helps avoid costly delays, break-downs and unnecessarily frequent laying-up of trucks for joint replacements.

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As usual, the January issue heralds the new year with some special editorial features, including an article on just what contractors are paying their supervisory personnel. The information is based on replies to a survey conducted by our Research Department.

And if you are one of the thousands in the construction industry who get the convention-going bug in January and February, keep in mind that CONTRACTORS AND ENGINEERS will be issuing convention dailies for your benefit at the meetings of the American Road Builders' Association, the Associated Equipment Distributors, and the National Sand & Gravel and Ready-Mixed Concrete associations.

Don Buttenheim

PUBLISHER

Consulting firms merge

Frederic R. Harris, Inc., consulting engineering firm, New York, N. Y., has merged with Wallace Clark & Co., Inc., international management consulting firm. The latter will operate as a division of Frederic R. Harris, Inc., under the management of its present officers. David Remer is president of Wallace Clark & Co., Inc., a 37-year-old firm with membership in the Association of Consulting Management Engineers.

Edward J. Quirin is president of Frederic R. Harris, Inc.

Barnes names president, chairman of the board

Fred B. Hout has been named president of Barnes Mfg. Co., Mansfield, Ohio, manufacturer of water systems and pumps. Hout succeeds M. H. Pryor, who has become chairman of the board of directors. Hout, vice president in charge of sales for the past 12 years, joined the company in 1943 as sales manager. Pryor had been president of the Barnes organization since 1939.

AISC re-elects Hayes

N. P. Hayes has been re-elected president of the American Institute of Steel Construction. Also re-elected are: first vice president H. Buckley Dietrich, second vice president James M. Straub; and secretary M. Harvey Smedley. L. Abbett Post, executive vice president since 1947, was also re-elected.

Littleford appoints Weber

Eric V. Weber has been named a planing consultant for Littleford Bros., Inc., Cincinnati, Ohio. Weber is with the Heater-Planer Division of the company and has had many years of experience in promoting planing work.

Spencer, White & Prentis names two vice presidents

Albert DiGiancinto and Donald B. McKinley have been appointed vice presidents of Spencer, White & Prentis, Inc., New York, N. Y., underpinning and foundation specialists. DiGiancinto and McKinley are members of the American Society of Civil Engineers, the National Society of Professional Engineers, and The Moles.

Ross joins Eimco

Neil L. Ross has joined the Eimco Corp., Salt Lake City, Utah. He will work as a sales engineer in the firm's export department in New York City.

Gorman-Rupp promotes

Robert L. Sears has been appointed a district representative for the Gorman-Rupp Co., Mansfield, Ohio. Sears' territory includes Illinois, Indiana, the western two-thirds of Kentucky, Michigan, southeastern Missouri, and Wisconsin.

On Yazoo River Basin Project, Yazoo County, Miss.

PIONEER GETS HIGH PRODUCTION FROM CAT* LOWBOWL SCRAPERS

DW20-NO. 456 LOWBOWL SCRAPER is push-loaded by a giant D9 Tractor. LOWBOWL design loads more material with less resistance clear to the end of the loading cycle for quicker heaped loads.

DW21-NO. 470 LOWBOWL SCRAPER speeds heaped load on haul. Turbocharged 6-cylinder Cat Engine, also in the DW20, delivers 300 HP (maximum output)—power aplenty for working in tough conditions.

At the time these pictures were taken, Pioneer Contracting Co., Inc., Memphis, had completed 100 working days of a schedule calling for 600. The project, involving 2,045,000 cu. yd. of earthmoving on the Yazoo River Basin, covers some 7 miles of work on channels, levees, drainage ditches and road relocation. There's a fleet of Caterpillar-built units on the job, including two DW20-No. 456 LOWBOWL Scrapers, a DW21-No. 470 LOWBOWL Scraper and a giant D9. They work 24 hours a day, 5 days a week. Says Pioneer's Scraper Foreman R. C. Parker: "We prefer Caterpillar-built equipment because of ease of operation. You can also depend on them for a minimum of down time. And wherever we are, Caterpillar Dealer service is always available."

Reports from job after job show that, under identical job conditions, Cat LOWBOWL Scrapers get bigger loads faster than competitive units. Both the four-wheel DW20-No. 456 and the two-wheel DW21-No. 470 have capacities of 18 cu. yd. struck and 25 cu. yd. heaped. Their LOWBOWL design loads more material with less resistance clear to the end of the loading cycle for quicker heaped loads. And the Turbocharged 6-cylinder Caterpillar Engine delivers 300 HP (maximum output) for fast loading, hauling against adverse grades and dumping in tough going.

Whether you're a two-wheel or a four-wheel man, you can count on profitable production from LOWBOWL Scrapers. Your Caterpillar Dealer will be glad to show you competitive production facts and figures from actual jobs. Better still, name the date—he'll demonstrate on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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WANTED—
THE HARD WORK

For more facts, use Request Card at page 18 and circle No. 345

Job: *remove 1,000,000 cobblestones plus 30,000 square feet of concrete*

Loading costs threaten profits until N.Y. firm buys this 2¾ yd Michigan

Due to extremely rigid job specifications and unusually tough material, Triboro Asphalt Company, Flushing, New York, faced a substantial loading problem in stripping 31 blocks of six-lane Third Avenue in Manhattan. Recognizing the advantages of a single machine with speed and power to keep costs from getting out of hand, they asked NYC distributor United Tractor & Equipment Corp to demonstrate a 2¾ yd Michigan Tractor Shovel. When they saw, they bought!

Replaces big crawler

The 24 mph Michigan replaced a 3 yard crawler loader. "The crawler was too slow . . . too often blocked traffic . . . and it couldn't get big enough loads to maintain the desired production pace," according to Supt James Magnotta. Smaller crawlers, attempting to load heavy granite-slab cobblestones, tore out final drives and ended up in the shop. Two big rubber-tire loaders, which had a crack at the job, were sent back to the yard. "They didn't have either the power or the traction needed," said Supt Magnotta.

Does job in 27 days

So the Michigan, working alone, piled and truck-loaded *all the cobblestones.* Over a million of them were handled, according to engineers. Each measured about 8 x 12 inches, weighed about 15 lbs. Individual bucket loads averaged 250 blocks each . . . 3,750 lbs. *The entire job was done in 27 eight-hour days* . . . far faster than other stripping contractors doing the same kind of work with power shovels and crawler-loaders elsewhere along Third Avenue. "Far better too," adds Magnotta. "Our Michigan left the sub-base clean after only one pass. Sensitive controls let the operator keep just enough down-pressure on the bucket. All we had to do before laying asphalt was level a few spots."

Breaks out concrete

After several days, the Michigan operator became so enthusiastic about the power of his machine, the street foreman tried to tame him down. He gave orders to break out and load some concrete pipe-vault roofs. Even this tough problem had a simple solution. By working bucket edge under the vault and using Michigan's terrific breakout, operator easily broke it loose. Concrete patches and driveway extension, some 15 to 50 square feet, proved just as easy. "I put in some terrific days—running around the job like a pickup truck," says the operator, Fred Cerbone. "Did a great amount of work yet was *less tired* at the end of a day than on anything else I've operated in my *25 years* with Triboro."

How to cut costs

Triboro's Michigan did more than boost operator satisfaction. It helped cut many dollars of expense from the multi-thousand dollar paving project! As every contractor knows, bidding is extremely competitive on this kind of job; by handling loading and clean-up efficiently, the Michigan kept these expense items from eating profits.

With Clark torque converter, power-shift transmission, power steer, and planetary-wheel axles standard on all models, Michigans deliver more usable power, traction, and speed than any other machines of their type. If you're willing to be convinced Michigan is in a class by itself, do what Triboro did: *ask for a demonstration.* You name the job!

Six-inch concrete slab breaks quickly as Michigan applies its tremendous breakout action. Fast work by the Michigan made job much safer for maintenance of normal highway traffic.

Michigan is a registered trade-mark of

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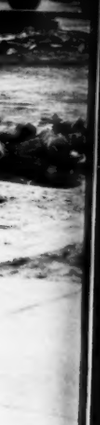

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